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THE FLORA OF THE TELÔM AND BATANG PADANG VALLEYS.

By H. N. RIDLEY, F.R.S.

DIRECTOR OF GARDENS, STRAITS SETTLEMENTS.

IN giving an account of the plants met with in these districts, I must premise that this portion of Perak was visited by Mr. Wray in 1888, who collected largely in the Batang Padang valley and on a hill known as Gunung Berumban, but which is not the mountain described in this account. He does not seem to have got to Telôm, where the greater part of the novelties were obtained, nor apparently did Father Scortechini, who got to the main range somewhere in the Batang Padang district. I have retained the name "Telôm" for the camp and country round, and "Telôm River" for the river at the head of which the camp was situated; but the proper name of the camp appears to be Lubok Tanam and of the river Sungei Bertang or Berotang. The other names, however, have appeared on maps, and are perhaps more identifiable.

The final point reached was well on the central mountain chain of the Peninsula, and the important thing shown by the botany of this region is the prevalence of a strong Himalayan element, pushing down along the main chain towards the south. This will be dilated on a little later.

During the period when I was awaiting the arrival of the rest of the expedition at Tapah, I was enabled to make a fairly good collection of the plants of that district, the flora of which is that of the low country, but containing many elements which are distinct from the low country districts of Selangor or Johore. This flora continues to the 12th mile on our route and alters slowly as we pass into the Batang Padang valley, where the flora completely changes, resembling, to a considerable extent, the flora of Ginting Bidei in Selangor. Bamboos become very abundant, not only in number of specimens but in species, though as too often happens few plants could be found in flower and so identified. The flora differs strikingly from that of the other Perak Hills, noticeably in the paucity of *Didymocarpi*, *Pandani* and *Mapanie*; *Anonaceæ*, abundant at Tapah, are scarce; *Dipterocarpeæ* are hardly seen anywhere. At one point in the Batang Padang valley we came upon the characteristic limestone-rock plant *Monophyllea*, together with *Forrestia monosperma*, which I have rarely, if ever, seen away from the limestone formation, although there are no signs of limestone anywhere in the district. Noticeable, too, is the

Javanese *Zippellia*, a herb belonging to the *Piperaceæ* with burr-like fruit, and *Desmodium megaphyllum*, a handsome shrub with violet flowers, also a Javanese type; these and a few other plants occurring in Java and not as yet known from the Himalayas, though distinctly mountain types, certainly suggest an invasion of a flora from Java.

Crossing a tributary of the Batang Padang, we come to the ridge, which is the boundary line of Pahang, and immediately the flora alters, *Balanophoras* are abundant, the golden balsam, *Impatiens oncidoides*, the violet, *Sanicle*, *Disporum*, Begonias, Rhododendrons, *Dichroa*, several species of *Strobilanthes*, and other *Acanthaceæ* appear. A strong Himalayan element prevails, which is, to a certain extent, accentuated on the higher ridges, such as Gunong Berumban, where we meet with *Pentapterygium*, *Carex*, *Gaultheria*, etc.

Noticeably absent from this region are *Anonaceæ*, *Dipterocarpeæ*, *Myristicaceæ*, and the characteristic plants of our other mountain ranges, *Tristania*, *Breckia*, *Leptospermum* and *Matonia*. These genera, except *Matonia*, are rather Australian types, and this element seems to be wanting on the main chain, though abundant on the hills nearer the coasts.

On these hill ridges we find a number of plants common to the Semangko Pass on the borders of Selangor and Pahang, but absent from our other mountain ranges, such are *Didymocarpus venustus*, *Archynanthus longicalyx*, *Psychotria brachybotrys*, *Filetia Ridleyi*, *Rhododendron Wrayi*, *Labisia longistyla*, *Strobilanthes scabridus*, *Nepenthes ramispina* and *Bambusa elegans*. But none of the Himalayan types have been met with there as yet.

The Himalayan types, of which so many were added to our flora by this expedition, seem to be centred in the main range, and most of them also occur in Java. They include the following: *Viola serpens*, *Sanicula europea*, *Ophiopogon intermedia*, *Castanopsis argentea*, *Begonia Roxburghii*, *Desmodium scalpe*, *Disporum*, *Dichroa febrifuga*, *Balanophora*, several species; *Gaultheria*, *Pentapterygium*, *Talauma mutabilis* and *Tricaliatra*, belonging to the group *Tupistrex*, which is Indo-Chinese. The *Tupistrex* are represented in the Peninsula by two species of *Tupistra*, which, it is noteworthy, have hitherto been met with almost exclusively on Bujang Malacca, a hill at no great distance from Telôm. The genus is otherwise Himalayan and Burmese only. It would take too long and perhaps (till further researches have been made in the highlands of the Peninsula) would be premature to discuss fully the relations of the Himalayan, and, one may say, the Palearctic element of the flora, and its distribution in our area. But it may be noted that it is almost confined to the main chain of the Peninsula, and where species of genera belonging to it do occur in the lowlands or on the out-lying hills away from the main chain, there are connecting stations for these plants with the main chain. Furthermore that this element re-appears in Java, but is remarkably absent

from Borneo and apparently (though the flora has not yet been adequately examined) from Sumatra also; none of these Himalayan plants have been met with on Matang in Sarawak nor on Kinabalu, the only high mountains of Borneo, which have been thoroughly explored. It is interesting, too, to note that, according to Mr. Robinson, the birds of the Telôm valley are also Himalayan in type.

I have only to add some notes as to the kind of country in which the Telôm district lies; the whole country consists, generally speaking, of heavily-forested hills, between which run streams of various sizes. The rock of which these hills consist is a mixture of slates and schists. At the Telôm Camp and further on towards Gunong Berumban are patches of perfectly flat ground, low-lying and muddy; these are of some size, and rather to the north of Gunong Berumban lies a similar flat area, apparently much more extensive, which is presumably the plateau described many years ago by Cameron and known by his name. In these plains the flora is different from that of the surrounding country, the forest is comparatively thin, the trees scattered, the characteristic ones being *Saurauja* and *Pyrenaria*; I have seen no similar flat lands anywhere else in the Peninsula. The highest land we visited is much less xerophytic than is usual at such altitudes in the Peninsula, and the xerophytic flora was met with chiefly on the ridges connecting the higher points. This may, perhaps, be the cause of the absence of such plants as *Bauhinia*, *Leptospermum* and *Matonia*, so abundant on all our other hills. A ridge behind the camp, called Telôm Ridge in this paper, was a good example of these somewhat drier ridges; the flora was poor in species, it being mainly covered with bushes of a new species of *Pinanga*, *Pandanus collinus* and *Allomorphia rosea*, and the ground between these was remarkably poor in herbaceous plants, ferns, etc., such as one usually finds abundant at these altitudes and on similar ridges elsewhere. It is possible that these bush palms may have something to do with the poverty of herbaceous plants, for one could not but compare the flora with that of the bertam hills of Tapah. To a botanist nothing could be more barren than these hills; between the great clumps of the bertam (*Eugeissona tristis*) hardly a fern or a herb was to be seen, although the ground was quite bare and there was plenty of light and room.

Palms were by no means so abundant and as varied in the Telôm woods as they are on the Taiping Hills and other hill ranges in the Peninsula, and as we travelled from the Tapah road to Telôm, one could note the circumscribed areas of the different species, which marked distinctly the complete changes of flora. At the 12th mile from Tapah *Eugeissona* was abundant, and *Orania macrocladus*, the Ibol, appeared as the *Eugeissona* began to get scanty, but only continued for a mile or so, when both disappeared. In the Batang Padang valley *Arenga Westerhoutii*, the Langkap, was the prevailing palm till at the upper end, *Livistona cochinchinensis* and a *Caryota*, apparently *obtusata*, were the

prominent palms. As soon as the Pahang boundary ridge was crossed all of them completely disappeared (I saw a single seedling of the *Livistona* near the camp but no more, and young *Caryotas* of some species were seen beyond the Telôm Camp). Beyond the boundary ridge *Pinangas* and *Areca*, with a few *Calamex*, were the only palms. *Licualas*, *Iguanuras* and *Oncosperma*, abundant in most hill forest, were not seen anywhere after leaving Tapah. As will be seen by the list which follows the collections made were very extensive, considering the comparatively short time at our disposal and the season. I have succeeded in identifying most of the plants collected, but in addition a large collection of Mosses and Hepaticas was made, which have not as yet been worked out. Mr. H. C. Robinson and Mr. C. B. Kloss assisted very materially in adding to the collections in every possible way. In an expedition from Telôm to Gunong Irau they brought back a number of specimens, some of which prove to be of great importance, and Mr. Kloss also obtained plants on the track from Telôm to Kuala Medang, after he and Mr. Robinson parted from me.

LIST OF FLORA.

MAGNOLIACEÆ.

1. *ILICIAM CAMBODIANUM*, *Hance*.

A small bushy tree, with rose-pink flowers, rather a large-leaved form.

Telôm, banks of the river above the water-fall and also on Gunong Berumban.

Distrib.—Cambodia.

2. *TALAUMA MUTABILIS*, *Bl.*

A shrub in fruit, on low swampy ground beyond Gunong Berumban.

Distrib.—Java, Moulmein.

3. *KADSURA LANCEOLATA*, *King*.

A climber in fruit only.

Telôm, in the forest. Endemic.

ANONACEÆ.

4. *POPOWIA NERVIFOLIA*, *Maingay*.

Small tree in young fruit. Endemic.

MENISPERMACEÆ.

5. *PERICAMPYLUS INCANUS*, *Miers*.

Telôm, about Sakai clearings, in flower and fruit. Common all over the Peninsula.

Distrib.—India, Java, Sumatra.

VIOLACEÆ.

6. *VIOLA SERPENS*, Wall.

The Violet was very abundant in open parts of the wood at Telôm on the river banks and in old clearings of the Sakais, which had been abandoned by them and were overgrown with small trees. The flowers were of a pale lavender colour (rarely white), the lower petals streaked with darker violet purple. The form is var. *glabra*.

Distrib.—India, Java, China.

POLYGALACEÆ.

7. *POLYGALA VENENOSA*, Juss.

This large herb or half-shrub is very abundant at Telôm, and also in the Ulu Batang Padang. It is usually about 4 feet tall. The light green leaves have the midrib and veins on the back of the leaf violet purple. The sepals are translucent, tipped with pink. The petals translucent white, the keel brilliant chrome yellow; on withering the petals become of a violet-pink, darkest in colour at the tip, the keel becomes crimson lake.

This plant does not occur "in all the provinces at low elevations," as King states in the "Materials." It is only met with in damp shady woods from 1,000 feet elevation upwards to about 4,000 feet, rarely below this. I have met with it below 1,000 feet only at Pulau Tawar in Pahang and Tambun near Ipoh in Perak, and at elevations of about 1,000 feet and upwards at Ginting Bidei and Semangko Pass in Selangor and in the Larut Hills in Perak, and in Penang. It is also a native of Java and Sumatra.

8. *XANTHOPHYLLUM AFFINE*, Korth.

A small but wide-spreading tree hanging over the river. Flowers white. The commonest species in the Peninsula. It is often a bush only; but, as King says, it is really otherwise very constant and cannot conveniently be broken up, even into varieties.

Banks of Telôm River, in flower and fruit.

Distrib.—Tenasserim to the Philippines.

GUTTIFERÆ.

9. *GARCINIA*, *sp.*

Some very lofty trees on the high ridges round Telôm, with large yellow flowers, and the stamens numerous in four broad obcuneate masses were probably *G. diversifolia*, King, but specimens were unprocurable.

10. *G. MAINGAYI*, Hook. *fil.*

Ulu Batang Padang, near the Batang Padang River, in flower.
Endemic.

TERNSTREMIACEÆ.

11. *EUEYA ACUMINATA*, Dc.

Common at Telôm Camp.

Distrib.—India, Malaya, Fiji.

12. *TERNSTREMLIA SCORTECHINII*, King.

On Gunung Berumban at 6,000 feet altitude.

I only found this in fruit, but I believe it is the plant intended by the description, although the fruit is much smaller than that described. The fruit is black, with the seed enclosed in a bright red aril. Endemic.

13. *PYRENARIA KUNSTLERI*, King.

A branching tree about 30 or 40 feet tall. The leaves, when dry, were not pustulate, and the nerves were more conspicuous than in the type specimens and others I have seen. The fruit is globose yellow and covered with rather stiff hairs. Abundant in low swampy ground near Telôm Camp. It was in fruit only, and the ground, in many places, was thickly strewn with the fruit. Endemic.

14. *GORDONIA*, *sp.*

Very large trees of a *Gordonia* were seen on the upper ridges all over this district. It was impossible to get specimens, owing to their great height, and only fallen corollas could be secured; it is probably *G. excelsa*, Bl.

15. *SAURAUJA TRISTYLA*, Dc.

In flower, with its small pink flowers, at Jor. Common in all the higher woods of the Peninsula.

16. *S. NUDIFLORA*, Dc.

A fairly big tree, with rosy white flower buds. Common at Telôm, up to about 4,000 feet elevation.

Distrib.—Java and Sumatra.

17. *SAURAUJA GRANDIS*, *n. sp.*

A large tree about 60 feet or more tall, young parts hairy. Leaves elliptic, subacute, base broad, 9-12 inches long, 5-5½ inches wide, above dark green, beneath nearly white (young red); nerves 12 pairs, elevated beneath, reticulations prominent, margins undulate, subserrate; young leaves above sprinkled with pale hairs; adults glabrous beneath, in young leaves hairy, especially on the nerves, beneath glabrous or nearly so scurfy; petioles 1½ inch long, glabrous panicles, usually pendent from the ends of the branches, occasionally on the trunk; peduncle about 4 inches long, branches 1 inch long, covered with short pale lanceolate, acuminate hairs, as are the pedicels. Calyx hairy, sepals four, orbicular ¼ inch

long. Corolla glabrous, 1 inch across, petals oblong obtuse, white (occasionally rose). Stamens over 30, numerous, glabrous, opening by terminal pores. Styles five, free to the base. Telôm River banks. One of the commonest trees here; a very conspicuous tree, with large flowers for the genus. Allied to *S. caniflora*, but a bigger plant with different leaves; it was well in flower at the time of our visit, and the ground was strewn with its blossoms.

MALVACEÆ.

18. *URENA LOBATA*, L.

Abundant in Sakai clearings. Telôm.

19. *HIBISCUS ABELMOSCHUS*, L.

A weed in Sakai clearings.

20. *H. MACROPHYLLUS*, Roeb.

Big trees seen in Ulu Batang Parlang.

21. *BOMBAX MALABARICUM*, Dc.

This tree was very common as far as Jor in the Batang Padang valley. No specimens could be procured, but the fallen flowers were picked up and were light yellow.

STERCULIACEÆ.

22. *STERCULIA ROSTRATA*, n. sp.

Small tree about 20 feet tall. Leaves obovate, oblong acute, with a short cusp narrowed towards the rounded base; nerves 12 pairs, elevated beneath, reticulations also elevated, 8 inches long, 3 inches wide, above dull green, beneath yellowish when alive, glabrous, except a few rusty hairs on the midrib and nerves above, beneath hairy on the nerves and with stellate hairs on the leaf surface; petiole hairy, 2 inches long. Panicle from an upper axil few branched, 6 inches long, branches few and short at the top, hairy; male flowers, $\frac{1}{10}$ inch long, red, lobes lanceolate not tailed connate at the tips, hairy, campanulate, tube very short anthers, about five on a very short column; female flowers not seen. Fruit carpels four, elongate, lanceolate, acuminate, narrowed at the base into a stalk, $\frac{1}{2}$ inch long, and ending in a long terete curved beak, $\frac{1}{2}$ inch long, whole carpel 4 inches long, and 2 inches across, when flattened. Seeds six, $\frac{1}{2}$ inch long, black. Telôm River bank.

A very distinct species in its very small flowers, and curious long-beaked carpels.

23. *S. ENSIFOLIA*, Mast.

Plants of this were seen near Jor.

23a. *LEPTONYCHIA GLABRA*, *Purcz.*

Common round Telôm. A common hill jungle tree, all over the Peninsula, and occurring also in Burmah and the Malay islands.

TILIACEÆ.

24. *TRIUMFETTA PILOSA*, *Roth*

Abundant along the track to Jor, not at all a common plant as would appear from King in the "Materials."

GERANIACEÆ.

25. *IMPATIENS ONCIDIODES*, *Ridl., Kew Bull., 1909, 11.*

A succulent herb about 2-4 feet tall. Stem fuscous brown succulent, $\frac{1}{2}$ inch through, ascending. Leaves plain green, ovate lanceolate to lanceolate acuminate, acute, narrowed to the base, margin crenulate with short processes in the crenulations, fleshy (thin and flaccid when dry), dark green above, paler beneath, $1\frac{1}{2}$ -6 inches long, 1-2 inches wide; nerves (primary) about 18 pairs, (secondary) hardly less distinct; petiole $1-1\frac{1}{2}$ inch long. Racemes subterminal, with two flowers or more. Bracts, lanceolate, acuminate, $\frac{1}{2}$ inch long, green. Pedicels 1 inch long. Flowers, opening singly or occasionally two together, large and showy, bright yellow. Sepals three, two laterals, ovate, cuspidate, $\frac{3}{10}$ inch long, pale green keeled, posterior ovate, yellow, darker above, $\frac{1}{2}$ inch long, $\frac{1}{6}$ inch wide; spur slender, $1\frac{1}{2}$ inch long. Petals, anterior, hooded, ovate, yellow, with a green rounded keel, $\frac{1}{2}$ inch long; laterals, with a short narrow base limb, three, lobed on the outer margin, upper lobe linear, oblong, horizontal, obtuse, tip rounded, middle large but no longer, semi-circular, terminal lobe short, oblong, obtuse, inner margin straight, the two petals together forming a lip $1\frac{1}{2}$ inch across—all pure chrome yellow. In one form the upper lobes have Indian red lines. Capsule fusiform green, nearly 1 inch long, seeds orbicular flat.

Telôm; abundant, growing in masses in wet deep mud, sporadically along banks and on rotting trees in dark shady spots.

This beautiful balsam has flowers resembling in form and colour those of some *Oncidium*, hence its name. It shows some amount of variation in the form of the two large petals, the lobes being often narrower, and some forms are conspicuous from having Indian red streaks on the upper lobes.

26. I. *SARCANTHA*, *Hook. fl. MSS.*

A herb about 4-6 inches tall, occasionally 12 inches. Leaves numerous, opposite lanceolate, acuminate at both ends, 3-4 inches long, $\frac{1}{2}-\frac{3}{4}$ inch wide, upper surface dark green, sprinkled with very short unicellular hairs, more prominent on the

veins, beneath pale-coloured glaucous, dotted with hairs similar to those above but longer, and denser on the nerves, margins wavy with short processes: petiole 1 inch long; nerves six pairs ascending. Flowers in upper axils on slender pedicels, $1\frac{1}{2}$ inch long, pubescent. Sepals, laterals ovate, cuspidate, keeled, $\frac{1}{2}$ inch long, posterior, ovate, cuspidate, pale pink, $\frac{1}{2}$ inch; spur slender, curved acuminate, $1\frac{1}{2}$ inch long. Petals, anterior, obovate, rose-pink, with a keel ending in a short point, laterals connate, bilobed, side lobes oblong obtuse, midlobe suborbicular emarginate with darker eye. Stamens deep crimson. Capsule fusiform, 1 inch long.

Telôm, on rocks in the river. Allied to *I. Griffithi*, Hook., with broader hairy leaves, and young parts of the stem pubescent and longer petioles.

RUTACEÆ.

27. *EVODIA PILULIFERA*, King.

Telôm (13539).^{*}

28. *E. PACHYPHYLLA*, King, var. *GRANDIS*.

A much stouter plant than the type with larger leaves. Leaflets elliptic, rounded, narrowed to the base, 5-6 inches long, 3 inches wide, with a stout petiole, 3 inches long; petiolules $\frac{1}{2}$ inch long; cymes 3 inches long (more lax than in type), including the peduncle 2 inches long. Cocci of fruit $\frac{1}{2}$ inch long.

Gunong Berumban at the top. There seem to be three forms of this plant. The type locality unknown has short almost obovate leaves, 2 or 3 inches long, with cymes over 1 inch long. A form collected on Bujang Malacca by myself is much dwarfer with acute leaves, 1-1 $\frac{1}{2}$ inch long, and very short cymes less than 1 inch long, and the variety described above. The flowers and fruits are much the same in all.

The species is confined to these mountain ranges so far as is known.

29. *ZANTHOXYLUM MYRIACANTHUM*, Wall.

A fairly large tree with the trunk, thickly armed with thorns. The fruits are very aromatic. In a Sakai clearing at Telôm, one large tree in fruit and a number of seedlings; not rare in the Peninsula, even at low elevations.

30. *MICROMELUM HIRSUTUM*, Oliver.

Telôm, near the river. A shrub in flower and young fruit.

* The numbers quoted thus are the distribution numbers of the Singapore Herbarium.

MELIACEÆ.

31. *CHISOCHETON LAXIFLORUS*, *King*.

A tree with stout-ascending branches about 40 feet tall, with hard-wood, the fruit in long pendulous spikes, 2 feet long, bright pink, glabrous. The leaves are larger than those described by King, having six pairs of leaflets, and the fruits of the type are said to be tomentose; but the plant does not agree with the description of any other species.

32. *BEDDOMEA RACEMOSA*, *n. sp.*

A large tree, young parts covered with ferruginous tomentum. Leaves simple, thinly coriaceous, ovate to elliptic ovate, subacute with a short cusp, base narrowed a little, eventually 4-8 inches long, 2½-4 inches wide; nerves 13 pairs, somewhat horizontal, meeting in loops intra-marginally; young leaves covered with ferruginous tomentum; adults glabrous; petiole ½-1 inch long, tomentose grooved. Racemes slender, 2-6 inches long, two or three together in the lower axils, tomentose, occasionally branched. Flowers small, rather remote, ⅛ inch long. Bracts small, linear, tomentose. Sepals five, oblong, subacute, tomentose. Petals, larger, rounded orbicular glabrous imbricate, five. Stamens five. Anthers lanceolate cells, diverging at base, connivent into a cone, subsessile on very short points in a ring, fleshy, composed of the filaments and disc, dehiscence introrse. Pistil superior and connate with the disc, ovary hairy above. Stigma conic, angled.

Perak, Ulu Batang Padang on the Pahang border. Flowers greenish white. The genus *Beddomea* has been hitherto confined to South India with two species, one *B. indica*, Hook., a shrub with pinnate leaves, and one *B. simplicifolia*, Bedd., with simple leaves. The addition of another species from the Malay Peninsula is of considerable interest. This species resembles *B. indica*, most in the form of its flowers and especially its stamens; but in its simple leaves and arboreous habit it resembles *B. simplicifolia*, Bedd.

OLACINÆÆ.

33. *GOMPHANDRA GRACILIS*, *King*.

A bush. Gunong Berumban at 6,000 feet altitude. Common in the mountain districts.

34. *G. LANCEOLATA*, *King*.

Telôm and Gunong Berumban.

ILICINÆÆ.

35. *ILEX GRIFFITHII*, *Hook. fl.*

A bush, with small rose-pink flowers. A form on Telôm Ridge was peculiar in having long slender erect shoots about

10 feet tall, covered with close set small ovate leaves from $\frac{1}{2}$ inch long, and pubescent on both sides, the branches, too, were very pubescent. This plant has, at first sight, all the appearance of a *Vaccinium*, especially when in fruit.

Telôm Ridge and Gunong Berumban, 4,600 feet. Common at these altitudes all over the Peninsula.

Distrib.—Assam, Sumatra and Java.

CELASTRINEÆ.

36. *EUONYMUS WEAYI*, *King*.

A little tree on the lower slopes of Gunong Berumban at about 5,000 feet elevation; occurs also on Gunong Batu Puteh and at Kota Glanggi in Pahang.

37. *CELASTRUS CHAMPIONII*, *Benth*.

A climbing shrub, with white flowers, and a capsule containing a single seed with a bright red aril. The leaves are very much thinner than usual; but the plant appears to be very variable.

Telôm, on the river bank, scrambling over trees, in flower and fruit abundant.

Distrib.—Hills of the Peninsula and Hongkong.

RHAMNEÆ.

38. *GOUANIA LEPTOSTACHYA*, *DC*.

Abundant on the road to Jor about the 15th mile, in flower.

Distrib.—India and Perak.

AMPELIDEÆ.

39. *VITIS LAWSONI*, *King*.

Gunong Berumban at 6,000 feet elevation.

Distrib.—Malay Peninsula.

40. *V. FURCATA*, *Lucas*.

Telôm, about the camp.

41. *V. GLABERRIMA*, *Wall*.

Telôm, at the camp. Common in the low country.

42. *V. TRIFOLIA*, *L*.

Telôm Camp. A common lowland plant.

SAPINDACEÆ.

43. *ALLOPHYLLUS COBBE*, *L.*, var. *GLABRA*.

A tree, with quite glabrous, trifoliate leaves; the leaflets lanceolate acuminate, shining on both surfaces pale, subcoriaceous nerved, $3\frac{1}{2}$ -5 inches long, $1\frac{1}{2}$ -2 $\frac{1}{2}$ inches wide, entire. Racemes branched slender, three to five on a peduncle, each 4-8 inches long. Bracts small. Telôm, banks of the river.

In spite of the similarity of the flowers and fruit, it is very difficult to bring oneself to class all the plants included as varieties by Hiern as varieties only. In life no plants of a genus could look more dissimilar than the tidal swamp bush (var. *racemosa*) and the tree *glabra*.

CONNARACEÆ.

44. ROUREA CONCOLOR, Bl.

Telôm Forest, on a fallen tree. Specimens nearly perished and in very bad condition but apparently this species, which occurs also in the low country and in Sumatra and Borneo.

LEGUMINOSÆ.

45. DESMODIUM LAXUM, Dc.

A slender wiry plant, hardly more than a herb, with pink flowers. Telôm, in a Sakai clearing, scanty, also obtained in Ulu Batang Padang by Wray, and occurring in India, China and the Malay islands.

46. D. SCALPE, Dc.

A slender plant like the last but with orange scarlet flowers. Telôm Camp, not previously recorded from the Peninsula.
Distrib.—Africa and India.

47. D. MEGAPHYLLUM, Zoll.

A beautiful bush about 8 feet tall, with violet flowers. Ulu Batang Padang, collected in the same district by Wray, but not known elsewhere in the Peninsula.

Distrib.—Tenasserim and Java.

48. ERYTHRINA, sp., probably LITHOSPERMA, Miq.

One or two big trees of an *Erythrina* in flower, but too lofty to obtain specimens from, were seen in the forests of the Ulu Batang Padang, undoubtedly wild. The occurrence of any species of the genus wild in the Peninsula has been extremely doubtful except in the case of the Lankawi plant, perhaps. *E. suberosa*, *E. indica*, *E. stricta* and *E. ovalifolia* are planted, and the specimens referred to in the "Materials," as well as at least most, if not all, of the *E. lithosperma* are also from remains of cultivation.

49. BAUHINIA, sp.

A large climbing species, with red and orange flowers, was seen, draping a mass of trees from the lower slopes of Gunong Berumban, and seedlings were seen scattered through the Telôm woods, but the flowering plants were quite inaccessible, and the species could not be identified.

ROSACEÆ.

50. *RUBUS GLOMERATUS*, *Bl.*

Telôm, in Sakai clearings and by the river bank. This takes the place of *R. Moluccanus*, which is an exclusively lowland plant, in the hills.

51. *R. ROSEFOLIUS*, *Sm.*

Common in abandoned Sakai clearings round Telôm. It is quite common at elevations of 2,000 feet in many parts of the Peninsula. The elongated orange red fruit is sweet and juicy when ripe, but quite flavourless.

SAXIFRAGACEÆ.

52. *DICHTROA FEBRIFUGA*, *Lour.*

This beautiful shrub is abundant round Telôm, in more open parts of the woods. The buds are white; and in the open flower the petals, stamens and stigmas are indigo-blue.

Distrib.—India, China, Malaya.

MYRTACEÆ.

53. *EUGENIA ROBINSONIANA*, *n. sp.*

A fairly large tree, with pale bark. Leaves thinly coriaceous, elliptic, shortly acuminate, obtuse, base slightly narrowed, paler beneath; nerves slender about 25 pairs, intermediate ones conspicuous, rather straight intra-marginal, $\frac{1}{2}$ inch from the margin, 6-7 inches long, 3 inches wide; petiole less than $\frac{1}{4}$ inch long, rather thick. Panicle short, 2 inches long or less, with a few about four short branches, 2 inches long. Flowers small, $\frac{1}{4}$ inch long, sessile. Calyx funnel shaped, smooth, green, mouth entire; corolla, petals white, orbicular, small, four; stamens fairly numerous, short; filaments slender; anthers small, oblong. Fruit globose, $\frac{1}{2}$ inch through, crowned with the raised ring-shaped calyx mouth.

Telôm, by the cascade. I cannot match this with any described species.

54. *EUGENIA PENDENS*, *Duthie.*

Banks of streams in forest, Telôm.

This small lax-spreading tree occurs in such situations all over the Peninsula from Singapore to Penang, and in Sumatra.

55. *RHODAMNIA TRINERVA*, *Bl.*

Small trees of this, nearly typical in character, were seen in the Telôm woods, though it is by no means common to find it in forest.

MELASTOMACEÆ.

56. *MELASTOMA MALABATHRICUM*, Linn., var. *POLYANTHUM*, sub-var. *MONTANUM*.

Telôm, near the camp and high up on the lower slopes of Gunong Berumban.

This form is the one commonly met with at such altitudes. A tall plant about 10 feet high, with large, dark-coloured flowers.

57. *M. PERAKENSE*, Ridl.

M. malabathricum var. *perakense*, King, *Mat. Flor. Pen. Mal.*, ii., p. 415.

Telôm, by the river bank.

This is a very distinct plant from *M. malabathricum* in its greater size in all parts, and its very large flowers and peculiar hairs on the calyx tube; no one seeing it alive could take it for a form of *M. malabathricum*.

58. *ALLOMORPHIA ALATA*, Scott.

Telôm.

Common on the river bank at Tapah also. Endemic.

59. *ALLOMORPHIA ROSEA*, n. sp.

A shrub about 8 or 9 feet tall, much branched; the branches velvety, with soft hairs (brown when dry). Leaves opposite nearly equal, ovate with a rounded base, subcordate, 4-6 inches long, 3-4 inches wide, above glabrous, beneath hairy on the nerves and nervules; nerves three pairs, two rising from the base of the midrib, one pair from higher up; petiole 2 inches long, velvety hairy. Panicle terminal, 8 inches to 1 foot long, 4 or 5 inches across, hairy. Flowers numerous, small, rose-pink. Bracts minute hairy caducous.

Calyx obovoid strigose, with four small acute points, rose-pink, $\frac{1}{10}$ inch long. Petals four, very small lanceolate acuminate, pink. Stamens eight, unequal, four narrow linear oblong, apex truncate, base shortly cordate, four oblong obtuse half as long. Style cylindric long, rather stout, stigma capitate. Capsule urn shaped, strigose $\frac{1}{10}$ inch long, apex convex four celled. Seeds numerous, narrowed to the base, elongate straight.

Telôm, very common, the prevailing shrub on the ridges at 4,000 feet and lower. Almost out of flower. A very pretty plant in bloom, with its large panicles of rosy-pink flowers.

I refer this species to *Allomorphia*, as it seems to be nearest to *A. exigua*, Bl., although quite a different style of plant. The three genera, *Oxyphora*, *Allomorphia* and *Anorincleistus*, as laid down for our species in the "Materials," require

some revision. The latter genus is particularly mixed, *A. floribundus*, King, being, according to Cogniaux, *Oxyphora macrophylla*, Treub.; while the Penang plant described as *Allomorphia exigua* var. *minor*, a pink-flowered thing (*A. exigua* having greenish flowers) is, I think, correctly referred by Haviland and others to *Anerincleistus*.

60. *A. ALBIFLORA*, n. sp.

A glabrous shrub, with terete brown branches. Leaves subcoriaceous glabrous, opposite equal, lanceolate, ovate, acuminate, 4 inches long, 2 inches wide; nerves three, rising from the base, with a finer one running shortly within the margin, nerves and horizontal nervules elevated beneath, scurfy, above dark green, beneath paler; petiole $\frac{1}{2}$ -1 inch long. Panicle terminal, 4 inches long, lax with a short peduncle. Flowers white in threes on the end of short pedicels, $\frac{1}{10}$ inch long. Calyx funnel shaped, $\frac{1}{10}$ inch long, with four short ovate lobes. Petals four, oblong quite obtuse, $\frac{1}{10}$ inch long, broad white. Stamens eight, all equal, filament long pustular, anther as long acuminate with a shortly-bilobed base and a small process on the back, yellow. Style stout cylindric, stigma small capitate, proterogynous. Fruit urn shaped with strong ribs, dehiscent loculicidally, $\frac{1}{8}$ inch long.

Gunong Berumban at 6,000 feet elevation.

61. *BLASTUS COGNIAUXII*, *Styff.*

A big shrub, overhanging the river banks, Telôm River, common. Flowers yellowish.

Distrib.—Johore and Gunong Pantai, Gunong Janing; Pahang: Kuala Lipis, Tuhan River; Selangor: Ginting Bidei, Bukit Kutu; Perak: Taiping Hills, Bujang Malacca. Also in Borneo, Sarawak.

62. *ANERINCLEISTUS MACRANTHUS*, *King.*

A shrub or a small bushy tree about 20 feet tall. The great characteristic of this curious plant lies in the three bracts which enclose the umbel. These bracts are lanceolate, acuminate and rose-pink in colour, 1 inch long, and nearly $\frac{1}{2}$ inch wide. The inflorescence on its slender drooping peduncle with these connivent pink bracts has a strange resemblance to the flower of some anonaceous plant. Between the bracts can be seen the small inconspicuous white flowers slightly tinted with pink. The bracts seem to fall off early. The allied species *A. hirsutus*, Korth., of Sumatra, does not appear to have those characteristic bracts.

The plant is very abundant at 5,000-6,000 feet elevation on Gunong Berumban, where we found it in flower and fruit.

63. *SARCOPIRAMIS NEPALENSIS*, Wall.

This little plant closely resembles some species of *Sonerila*, but its extremely shortly-stalked flowers, with their eight stamens and oblong anthers and the curiously-veined large valves to the capsule, distinguish it readily. It has never previously been met with in the Peninsula, and is an interesting addition to our Flora, being another of the Himalayan plants which have found their way down the mountain chains to the heart of the Peninsula. It is recorded from the Himalayas, Khasiya, Sumatra and Java. In the forests at Telôm at 3,000-4,000 feet altitude.

64. *SONERILA TENUIFOLIA*, Bl.

Not rare in the Telôm woods, nearly out of flower at the time of our visit.

Distrib.—Mt. Ophir; Gunong Batu Puteh in Perak; and Java, Sumatra and Borneo.

65. *S. HIRSUTA*, *n. sp.*

S. tenuifolia var. *hirsuta*, Stapf.

A slender erect plant, 3-8 inches tall, little or not branched. Stems bright red and hairy. Leaves usually bright red purple, lanceolate, acuminate, dentate, base rounded, $\frac{1}{4}$ -1 inch long, $\frac{1}{4}$ inch wide, closely hairy on both sides with multicellular of 10 crimson hairs; nerves inconspicuous. Flowers axillary and terminal on short pedicels, solitary. Calyx narrow obconic, nearly glabrous, $\frac{1}{8}$ inch long, teeth very short subacute. Petals white, $\frac{3}{8}$ inch long, oblong, mucronulate. Stamens shorter, $\frac{1}{4}$ inch long, anthers graceful-curved acuminate yellow. Capsule turbinate, $\frac{1}{4}$ inch long, smooth shining, valves low and straight edged, pedicel $\frac{1}{2}$ inch long.

Gunong Berumban on mossy banks at 6,000 feet elevation.

I take this to be the plant referred to by Stapf. as a variety of *S. tenuifolia*, Bl.; but as it differs so conspicuously in the form and hairiness of its leaves and larger flowers, as well as other minor points, I consider it advisable to keep it as a distinct species. The plants described by Stapf. were obtained on Gunong Bubu, and in other parts of Perak, of which the localities are not given.

66. *S. PICTA*, Korth., *Krindkunde*, p. 249, t. 52.

This species was based on a plant obtained in Sumatra at "Batang Bessie" (Besi), and is well figured in the above-mentioned plate in 1897. I obtained on the Kelantan River in Siak, Sumatra, a plant exactly similar to the one figured by Korthals, and found that a plant by no means rare in the Malay Peninsula, but omitted from the "Materials of the

Malay Peninsula," was identical except for the absence of the silvery marks on the leaves of the type. There are also in the Malay Peninsula a number of quite dwarf plants, often with white-spotted leaves, which, different as the extremes are, I am unable to separate, except as varieties, as there are connecting links between them. I will therefore describe them here as several of the varieties occur abundantly at Telôm.

SONERILA PICTA, Korth., a dwarf herb, 3-12 inches in height, usually about 6 inches tall, quite glabrous. Leaves lanceolate to ovate lanceolate or ovate in dwarf plants, narrowed to the base, apex acute or acuminate, unequal, one not more than half as big as the other, $\frac{1}{2}$ -3 inches long, $\frac{1}{2}$ -1 inch wide, margin obscurely serrate with short processes, dark green above (often marbled or veined white), glaucescent beneath; nerves three pairs, all rising from above the base; petiole $\frac{1}{4}$ - $\frac{1}{2}$ inch long. Flowers in axillary and terminal umbels about five in an umbel, small rose-pink. Calyx funnel shaped, $\frac{1}{10}$ inch long, with three triangular acuminate processes. Petals three, lanceolate acuminate, $\frac{1}{6}$ inch long. Stamens three, filaments slender, anthers lanceolate acuminate. Style fairly stout, stigma capitate. Capsule smooth pale shining turbinate with low rounded valves.

Malay Peninsula, Sumatra and Borneo.

Var. a. TYPICA.

Leaves $1\frac{1}{2}$ -3 inches long, $\frac{1}{2}$ -1 $\frac{1}{4}$ inch wide, lanceolate, margins little toothed. Calyx and peduncle covered with glandular hairs, lobes more closely hairy. Leaves often with a broad silvery band on the midrib and nerves.

Sumatra, Kelantan River, Siak (Ridley, 8968).

Var. b. CONCOLOR.

Plant about 6 inches to 1 foot tall, branched. Leaves lanceolate, plain green. Calyx and pedicel quite glabrous, Ulu Batang Padang, Gunong Angsi, Maxwell's Hill, Bukit Kutu (7316), Mt. Ophir, Bukit Hitam (7321), Siak, Sumatra (8994): with traces of the hairs on the calyx as has a form from Mt. Ophir (No. 3291), with short oval leaves. Pahang, Kota Glanggi, Tahan Woods, Telôm.

Var. c. dwarf form PUSILLA.

Not more than 6 inches tall. Leaves crowded ovate.

Sub-var. a. Leaves plain green. Telôm, Gunong Pantai. Sarawak, Quop (*Haviland*), Tawarar River (1284).

Sub-var. b. Leaves with a white median bar. Lingga (Hullett).

Sub-var. c. Leaves spotted with white on upper surface. Tahan Valley Woods, Telôm, Gunong Berumban.

67. *S. VELUTINA*, n. sp.

Stems 6-12 inches tall, densely rufous, hairy, with longer hairs at the nodes. Leaves ovate obtuse, base rounded, margins denticulate hairy on both surfaces, 2 inches long, $1\frac{1}{2}$ inch wide; nerves two pairs, radiating from the base, one pair from above the base; petiole $\frac{1}{2}$ inch long, hairy. Flowers three or four on a short $\frac{1}{2}$ inch, hairy peduncle, umbelled, rose-pink or white. Calyx, $\frac{1}{10}$ inch long, narrow funnel shaped, with short points, green hairy. Petals, oblong obtuse, $\frac{2}{3}$ inch long, and half as wide, hairy, five, with glandular hairs on the keels. Stamens, cylindric acuminate curved, three, yellow; base cordate, $\frac{1}{8}$ inch long; filaments pink. Capsule cup-shaped turbinate, $\frac{1}{4}$ inch long, with a few hairs on conical bases. Valves short rounded; pedicel nearly $\frac{1}{2}$ inch long, thickened, triquetrous with decurrent bosses from which rise hairs; peduncle 1 inch long, triquetrous above, with similar processes. Telôm and Gunong Berumban, 3,000-6,000 feet altitude, covering the banks. A pretty plant with its velvety bright green flowers and large pink or white flowers.

A more slender form rooting at the nodes. Leaves less hairy, lanceolate ovate; peduncles of flower more slender. Banks at Telôm and in the Ulu Batang Padang.

68. *S. CAPITATA*, Stapf.

This plant, described from specimens collected on Gunong Batu Puteh, is somewhat variable in foliage. In the type the leaves are obovate, elliptic or oblong, with a short stout petiole. The Telôm plants differ in the length of the petiole and the form of the leaf, and may be described as a variety.

S. capitata var. *longipetiolata*. Leaves quite glabrous above, lanceolate acuminate to ovate acuminate, 6 inches long, and $2\frac{1}{2}$ -3 inches wide; petiole slender, 3-4 inches long. Petals red and white. Stamens yellow. Telôm, in forests by streams, Nov. 21-08.

Some plants gathered in different spots were very much weaker with narrow leaves; the petiole and peduncles crimson hairy, and the fruits densely hairy muricate, but otherwise they resembled the local plant.

69. *S. REPENS*, Stapf.

Telôm, on the ridge behind the camp at an altitude of about 4,000 feet. Flowers white. This seems to be confined to Perak, occurring also on the Taiping Hills, and Bujang Malacca (oddly localised by Stapf. in the "Materials for the Flora of the Malay Peninsula," all through the article as "Malacca; Bujang").

70. *S. CÆSIA*, *Stapf*.

Telôm, banks of the stream, not very abundant. Flowers white. Stapf. gives them as pink. Apparently peculiar to Perak and this locality. Wray obtained it at Gunong Batu Puteh.

71. *PHYLLAGATHIS HISPIDA*, *King*.

Abundant above Telôm and on Gunong Berumban. In fruit at this time. It is common in the hills of Perak and Pahang.

72. *PH. ROTUNDIFOLIA*, *Bl.*

Common in the Tapah forests and in the Batang Padang valley up to the border line of Pahang, but not seen anywhere in Telôm, or its neighbourhood.

It is common in the forests of the plains from Johore, northward, also in Burmah, Sumatra and Java.

73. *MARUMIA NEMOROSA*, *Bl.*

Telôm, near the river, common and widely distributed in the Peninsula, Sumatra and Borneo.

74. *ANPIETRUM PALLENS*, *Bl.*

Ulu Batang Padang.

75. *DISSOCHÆTA PALLIDA*, *Bl.*

At Telôm. The form here, as at high altitudes in the Taiping Hills, differs from the form in the plains in its leaves ending abruptly in a long point 1 inch in length. I should take it to be the Sumatran *D. montana*, Cogn., but the stamens are of full size and not short as in that species.

76. *MEDINILLA PENDULIFLORA*, *n. sp.*

A large epiphytic shrub, branches four angled. Leaves sessile in pairs, ovate acuminate, fleshy, with a single pair of nerves running to the apex from the base and an intra-marginal pair very close to the margin, 6 inches long, $2\frac{1}{2}$ inches wide. Inflorescence umbellate on a long slender peduncle, 6-8 inches long, with five or six branches at the end; the branches slender, flexuous, and occasionally branched again, 1-1 $\frac{1}{2}$ inch long, angled, and bearing one to three flowers. Flowers on pedicels $\frac{1}{2}$ inch long, pure white and fragrant. Calyx cupular with a short raised edge undulate, with six black spots (when dry) marking the sepals. Corolla lobes five, obovate, with a broad base rounded at the tip, $\frac{1}{3}$ inch long. Stamens 10, all similar, little shorter than the petals. Filaments short and anthers long curved acuminate, base prolonged shortly into a blunt-bilobed process, a low triangular keel on the back, ending in a short straight point. Style shorter, slender, cylindric. Stigma capitate.

Gunong Berumban at 6,000 feet elevation

This is a most exquisite plant. Its long hanging peduncles, with pure white deliciously fragrant flowers, would make it attractive anywhere. Only one plant was seen on a tree overhanging the track up Gunong Berumban. Its nearest ally in the Peninsula is *M. perakensis*, King.

77. *M. VENUSTA*, King.

Common at Telôm, on trees by the river. A large-spreading shrub. Flowers white.

78. *M. CRASSINERVIA*, Bl.

On a tree by the Batang Padang River.

79. *PACHYCENTRIA TUBERCULATA*, Korth.

Telôm, on trees by the camp.

Distrib.—Tenasserim and Borneo, not rare in the Peninsula.

BEGONIACEÆ.

80. *BEGONIA* (§ *Casparya*) *ROXBURGHII*, Dc.

Stem about 3 feet tall, stout succulent glabrous, dull red.

Leaves lanceolate acuminate, with a long point, base unequally cordate, margin sparingly toothed, 6-8 inches long, 2 inches wide, longest lobe of leaf rounded, $\frac{1}{2}$ - $\frac{3}{4}$ inch long, glabrous, light green; nerves five short ones from the base, the upper ones from the midrib. Flowers in clusters on short axillary peduncles, $\frac{1}{4}$ inch long, few, white; male $\frac{1}{2}$ inch across. Sepals two, ovate obtuse. Petals two, equally large, obovate. Stamens numerous in a head: filaments distinct half the length of the linear oblong blunt, not apiculate anther. Females, sepals and petals as in male, ovary bluntly trigonous. Stigmas two, each bilobed with spirally-twisted linear lobes. Fruit green-pulpy, $\frac{1}{2}$ inch long, trilobed, lobes rounded at the base not winged, but with a ridge ending in a short blunt process. Seeds minute brown, with few large oblong reticulations.

Telôm Woods, also Ginting Bidei in Selangor.

Distrib.—Nepal, Burmah and Assam.

This is the first of the fleshy-fruited Begonias from the Peninsula. I cannot distinguish it from the Indian *B. Roxburghii* (of which, however, I have seen no specimens) except that the leaf is lanceolate rather than ovate.

81. *B. CAENOSULA*, n. sp.

A succulent acaulescent plant, with a creeping rhizome. Leaves ovate cordate, oblique, the lobes almost or quite equal short rounded with an entire margin, 4-5 inches long, 3-4 inches wide; nerves six from the base of the leaf, the two

central ones soon branching, red hairy, otherwise the plant is glabrous succulent light green (drying very thin and flaccid); petiole 3-5 inches long, glabrous. Peduncle axillary, 5-7 inches long, glabrous, with one or two branches, 1 inch long at the top. Flowers white. Males with two very thin oblong obovate sepals, $\frac{3}{10}$ inch long. Petals two, linear oblong, much narrower. Stamens in a globular ball on a peduncle of equal length; filaments distinct, as long as the anther. Anthers spathulate obtuse truncate. Females not seen. Fruit three winged, $\frac{1}{2}$ inch long, one wing larger, rounded, $\frac{1}{4}$ inch across, the others much narrower.

Ulu Batang Padang, growing on muddy slopes of the hill side in thick forest.

This pretty species is evidently near *B. debilis*, King, of which I have seen no specimens, differing in the form of the leaf; petals very different from the sepals, different form of the anthers, which are borne on a cylindric peduncle, and the posterior fruit wing rounded, semi-ovate not oblong.

82. *B. PRÆCLARA*, King, *Mat. Fl. Mal. Pen.*, 13.66 (594) 1902.

B. decora, Stapf., *Kew Bull.*, 1893, 29.

A beautiful plant with deep green or purple red leaves, marked along the veins with lighter colour, usually red underneath and hairy all over, very variable in colour and also in size. The flowers vary in size. In some the petals are only $\frac{1}{2}$ inch long, in others 1 inch long pure white or in red forms pinkish. King describes his plant as having "a few scattered hairs on the nerves beneath" and the petioles as having "a few flexuose hairs near the apex." The Telôm plant is densely red hairy on the nerves beneath, and the petiole is also very hairy. The sepals are $\frac{3}{4}$ -1 inch long and $\frac{2}{3}$ inch wide; petals ovate, smaller. The stamens are spathulate obtuse in life, showing no distinct filament. It is abundant in the Telôm woods.

I cannot separate this plant from *B. decora*, Stapf., a plant obtained by Mr. Curtis in the Lankawi Islands and sent to Messrs. Veitch's Establishment in 1891 or 1892. It was exhibited at one of the Horticultural Shows in London as *B. barbata*, but the identification was shown to be erroneous and it was called *B. decora*. No description was ever published of it so far as I can make out, but in the list of new plants of the year, published in the "Kew Bulletin" above quoted, the name, with a few lines about it, is given, and the locality is given as Perak. It was under cultivation under the name of *B. decora* in the Singapore Botanic Gardens in 1891, but died out.

In the *Index Kewensis* it is put down as a Garden Hybrid, and, perhaps on account of this error, was not mentioned by Dr. King in the "Materials" under the name *B. decora*.

A similar fate befell *Begonia Rajah*, a native of Trengganu. I have retained Dr. King's name *B. preclara*, as Stapf's *B. decora* is practically a *nomen nudum*. To add to the confusion there is another *Begonia decora* from Brazil, mentioned in the Supplement to "Nicholson's Gardener's Dictionary."

83. *B. VENUSTA*, King.

What I take to be this species with beautiful white flowers, 3 inches across, occurred on the flat plain, north of Gunong Berumban.

84. *B. PAVONINA*, n. sp.

Rhizome creeping red, short. Leaves ovate cordate acuminate, or acute, base unequally lobed, lobes rounded, margin entire, glabrous, except when very young, when they are sparingly ciliate on the edge; nerves nine, including the midrib from the base of the leaf, 5 inches long, 4 inches wide, largest lobe, 1 inch long, light satiny green above when young, eventually deep green shot with peacock blue, the whole leaf appearing often of a superb blue, beneath red; petiole, 7 inches long, red, glabrous, succulent. Flowers few on a peduncle, 5-6 inches long, and glabrous. Bracts linear oblong soon caducous. Male flowers, sepals two ovate obtuse unequal ($\frac{1}{2}$ inch or more long, $\frac{1}{4}$ inch wide), white-tinted pink. Petals narrower, linear, oblong obtuse, white, often tinted with pink, $\frac{1}{2}$ inch long, $\frac{1}{8}$ inch wide. Stamens in a small sessile or very shortly-stalked head, yellow; filaments slender distinct; anthers oblong obtuse, slightly narrowed towards the base (apiculate when dry). Female sepals two, ovate, white. Petals two (rarely three). Styles two, separate about half way down, divided above into two spiral arms, ovary three-winged wings subequal. Fruit with two small and one large elliptic wings.

Telôm Woods, abundant.

A most beautiful plant, the leaves of which in most specimens are of an exquisite peacock blue above and red beneath. This colouring is not similar to the blue iridescence which appears on *Selaginella Willdenovii*, *Phyllagathis rotundifolia* and other plants in wet corners of woods, but seems to be normal to this plant. The leaves, when young, are of a bright light green, passing later into the bright blue. The flowers are 1 inch or more across.

85. *B. ROBINSONII*, n. sp.

Rhizome stout fleshy, $\frac{1}{2}$ inch through, with ovate sheaths. Leaves ovate subacute, base unequally lobed, lobes rounded, 3 inches long, 2 inches wide, rather fleshy, bright green quite glabrous, polished above, dull green beneath, margins entire; nerves five to seven from the base, midrib not distinct, all

branching low down; petiole glabrous 2 inches. Peduncle $1\frac{1}{2}$ inch long from the axil of a leaf, usually glabrous. Bracts below the inflorescence two large ovate green, $\frac{1}{2}$ inch long, and nearly as wide, acute; male flowers, pedicel, $\frac{1}{4}$ inch long, white. Sepals two, ovate obtuse, $\frac{3}{8}$ inch long, $\frac{1}{4}$ inch wide, white. Petals two, oblong obtuse nearly as large. Stamens capitate on a short column, filaments short, as long as the short oblong anther, connective short rounded oblong.

Telôm Woods, occasionally climbing a short way up tree trunks. This species in a dried state much resembles *B. pavonina*, but is easily distinguished by its thick rhizome, more succulent green leaves, and the large bracts persisting till after the flower opens. The petals in *B. pavonina* are narrower in proportion to the sepals, and the sepals more distinctly acuminate.

LYTHRACEÆ.

86. DUABANGA SONNERATIOIDES, *Ham.*

Fallen calyces of this tree were seen scattered all over the Telôm Woods up to about 4,000 feet altitude.

Distrib.—India.

SAMYDACEÆ.

87. CASEARIA KUNSTLERI, *King.*

Telôm Forest.

CUCURBITACEÆ.

88. GYNOSTEMMA PEDATA, *Bl.*

This elegant little climber was in flower, on the track to Jor, at about the 15th mile from Tapah.

UMBELLIFERÆ.

89. SANICULA EUROPEA, *L.*

The Sanicle was abundant in abandoned Sakai clearings. This is the first record of the occurrence of this plant in the Malay Peninsula. It occurs in Europe and through temperate Asia to the Himalayas, Java.

90. HYDROCOTYLE JAVANICA, *Thumb.*

In abandoned Sakai clearings at Telôm. It also occurs in the Taiping Hills, and in India and Ceylon, in all the Malay islands high enough for it to the Philippines and Australia.

ARALIACEÆ.

91. ARALIDIUM PINNATIFIDUM, *Miq.*

Plants seen in the woods round the Telôm Camp, not in flower, abundant in the low country of the Peninsula, less common in the hills.

Distrib.—Sumatra.

92. *HEPTAPLEURUM LURIDUM*, *King*.

Gunong Berumban at 6,000 feet elevation. It also occurs in the Taiping Hills. The leaves are rather larger than described by King, being often over 4 inches long and 1 inch across. The fruit which is undescribed I obtained on the Taiping Hills. It is as large as a pea, five angled with five flattened, half elliptic seeds.

93. *H. CORIIFOLIUM*, *n. sp.*

Shrub stems pale wrinkled, rather stout. Leaves five, petiolate stiffly coriaceous, petiole 3 inches long, leaflets unequal, elliptic abruptly acuminate, 2-4 inches long, 1-2 inches across, midrib on the back strongly elevated and wrinkled; nerves 12 pairs, distinct beneath and elevated in the upper surface; petiole 1 inch long. Stipules large, coriaceous lanceolate obtuse, nearly 1 inch long. Panicle shorter than the leaves, 2-3 inches long of two or three branches stout angled from a short ($\frac{1}{2}$ inch) thick peduncle. Branchlets short, 1 inch long, ending in umbels of five or six flowers; pedicels very short, 1 line long; calyx cupular with a thin-spreading margin. Buds bluntly conic. Petals five, subtriangular with a broad base, narrowed upwards to a rounded tip, 1 line long. Stamens five, as long with long slender filaments and oblong anthers. Styles in a short cone. Fruit $\frac{1}{2}$ inch long, strongly five ribbed, ovoid, crowned by the cone-shaped stigma. Gunong Berumban at 6,500 feet altitude. In flower and fruit.

Certainly allied to *H. triste*, King, of Ulu Batang Padang, but that is described as trifoliolate with reflexed petals, and narrow oblong fruit.

94. *TREVESIA PALMATA* var. *CHEIRANTHA*, *Clarke*.

Common in the Tahan Woods.

Distrib.—Malay Islands.

95. *DENDROPANAX MAINGAYI*, *King*.

Gunong Berumban. Common on all the hill ranges at about 4,000 feet. Endemic.

96. *ARTHROPHYLLUM MONTANUM*, *n. sp.*

A tall plant with the habit of *A. diversifolium*. Leaves 2 or more feet long, simply pinnate; leaflets about 12 pairs, lanceolate acuminate, or linear lanceolate acuminate acute, 4-6 inches long, $\frac{1}{2}$ -1 inch across, thinly coriaceous drying pale; nerves three to four pairs, sunk above, elevated below; petiole $\frac{1}{4}$ inch long. Umbels terminal on simple peduncles, $\frac{1}{2}$ inch across, crowded on the ends of a branch or on compound umbels, primary peduncle 4 inch long, secondaries $1\frac{1}{2}$ -2 $\frac{1}{2}$ inches long, all glabrous. Flowers very small, 9-20 in an umbel; pedicels $\frac{1}{8}$ inch long. Calyx shallow undulate. Petals very small, five, ovate triangular obtuse calyptrate.

Stamens five; filaments slender, thickened at the base, longer than the anther; anther reniform. Style short conic. Fruit $\frac{1}{4}$ inch long, crowned with the sinuate calyx and short conic style, one celled, one seeded, ovoid globose.

Gunong Berumban at 6,000 feet altitude. Also Hulu Semangko, Selangor, and on Gunong Kledang, Perak (Ridley, 9683).

Easily distinguished from *A. diversifolium*, of which it has the habit by its narrower and much smaller flowers, more coriaceous leaflets. In the Gunong Kledang plant the leaflets are very narrow, 6 inches long and $\frac{1}{2}$ inch wide. The whole plant is quite glabrous. *A. diversifolium*, Bl., is a common plant in the low country, but *A. montanum* appears only at high elevations. King describes the leaves of *A. diversifolium*, Bl., as bipinnate. I have never seen any bipinnate leaves on any *Arthrophyllum*. *A. diversifolium* is very common in Singapore, an abundant plant in secondary growth and coming up everywhere, but all I have seen have simply pinnate leaves.

97. *BRASSAIOPSIS PALMATA*, Kury.

Telôm, near the camp, and scattered about through the forests.

It is common near Tapah.

Distrib.—India.

CORNACEÆ.

98. *MASTIXIA PROPINQUA*, n. sp.

Branches brown when dry and grooved, the internodes 1 inch or more long. Leaves ovate acute entire, base slightly narrowed, rounded, coriaceous glabrous above with impressed nerves, paler beneath, the midrib and nerves much elevated, the midrib puberulous, becoming at length glabrous, whole leaf drying dark black above, whitish beneath, 5 inches long, 2 inches wide; petiole pubescent $\frac{1}{2}$ inch long. Panicle shorter than the leaves, pubescent. Bracts lanceolate, single at the base of each branch, pubescent. Flowers shortly pedicelled with a pair of ovate lanceolate acute pubescent bracts, pedicel and ovary hairy. Calyx lobes very short pubescent. Petals ovate fleshy pubescent, outside glabrous keeled within, four. Stamens four, anthers ovate cordate on very short filaments. Disc fleshy, indistinctly lobed, rather tall. Style stout, stigma flat broader, obscurely lobed.

Telôm.

I think this must be the plant referred to as *M. sp.* (a) by King as distinct, but of which fruit only was obtained by Wray and Kunstler at an elevation of 3,000-3,400 feet in Perak. It is certainly close to *M. Maingayi*, but is more glabrous. King refers to the latter as to pentamerous in the Synopsis and in describing Wray's plant, but describes it as tetramerous.

RUBIACEÆ.

99. *ARGOSTEMMA PICTUM*, Wall.
Gunong Irau. Not rare in the Peninsula.
100. *A. YAPPII*, King.
Telôm, in damp spots in the forest. The corolla is white like that of other species, not green as in the "Materials."
Distrib.—Perak and Selangor (Semangko Pass).
101. *A. ÆQUIFOLIA*, Ridl. *A. Ridleyi*, King.
At Telôm and on Gunong Berumban. Except in the more erect habit and rounder leaves with longer petioles, this is quite like the Ophir plant, on which the species was based. King overlooked the paper on which this species was described—viz., Flora of Ophir, "Journ. Roy. Asiat. Soc. Straits Branch," No. 35, p. 15.
102. *A. INVOLUCRATUM*, Hemsl.
Telôm. A tall form.
103. *A. HIRTUM*, Ridl.
A. involucratum var. *mollis*, King.
Telôm. This species was also published in the paper mentioned above. I think it is specifically distinct from the species *A. involucratum*, Hemsl., which was described from plants from the Taiping Hills.
104. *A. SUBCRASSUM*, King.
Telôm.
105. *A. LANCEOLATUM*, n. sp.
A succulent erect herb, 8 inches tall, simple or with a single branch. Leaves very unequal, the larger lanceolate long acuminate, the base usually less acuminate than the tip, margins subserrate or undulate with short thorn-like processes, above glabrous, beneath thickly sprinkled with short hairs, and paler in colour; nerves six to nine pairs, meeting in intra-marginal loops, 4 inches long and $\frac{1}{2}$ inch wide or more, ovate lanceolate, 3 inches long by $1\frac{1}{2}$ inch wide; petiole $\frac{1}{4}$ inch long, pubescent; small leaf lanceolate, $\frac{1}{4}$ inch long, resembling the stipule. Inflorescence terminal, of three umbellate cymes, on a peduncle, $\frac{1}{2}$ -1 inch long. Flowers about 12, nearly $\frac{1}{2}$ inch across white, all glabrous. Sepals ovate acute, very short, $\frac{1}{10}$ inch long. Corolla lobes lanceate acuminate, narrow. Stamens in a long cone, longer than the petals, with linear lanceolate anthers, terminating in a long terminal process, filaments very short. Fruit small cupular, crowned with the very small calyx teeth, $\frac{1}{8}$ inch in length. Telôm.
Allied to *A. subcrassum*, King, but distinct in its pubescent leaves, glabrous inflorescence and much smaller calyx lobes.

106. *A. VISCIDUM*, *n. sp.*

A dwarf plant, 4-6 inches tall. Leaves equal ovate lanceolate entire obtuse, $1\frac{1}{2}$ inch long, $\frac{1}{2}$ inch wide, base rounded; petiole slender, $\frac{1}{2}$ inch long, above glabrous, minutely pustular, beneath similar but paler and with the nerves covered with short viscid hairs. Stipules ovate herbaceous, obtuse with a few short hairs on the tip, $\frac{1}{10}$ inch long, green. Cyme solitary terminal, $\frac{3}{4}$ inch long, peduncle, nearly $\frac{1}{2}$ inch long. Bracts ovate hairy on the edge. Flowers about shortly pedicelled, pedicells thickly white hairy. Calyx short, cupular densely woolly hairy, lobes five, ovate obtuse, as long as the tube. Corolla lobes lanceolate obtuse hairy, within nearly $\frac{1}{4}$ inch long. Stamens anthers lanceolate acuminate, connivent into a cone, half the length of the petals, glabrous, style stout and stigma globose, longer than the stamens. Capsule, $\frac{1}{4}$ inch long, viscid hairy.

Telôm Cascade, on rocks by the stream. This is allied to *A. sequifolium*, Ridl., but erect or nearly so, with smaller flowers, and peduncle shorter than the leaves. The whole plant appears to be very viscid as the sand in which it was growing sticks thickly to the specimens. I found very little of it.

107. *HEDYOTIS CAPITATA*, *Wall.*

Scrambling over bushes by the river bank and in abandoned clearings. Common all over the Peninsula.

108. *H. STIPULATA*, *R. Br.*

A small white-flowered plant, growing sometimes in masses on rocks in the Telôm River, occurs also elsewhere in Perak, and at Kota Glanggi in Pahang.

Distrib.—India and Java.

109. *H. MACROPHYLLA*, *Wall.*

Telôm. Occurs in Malacca and Penang (Ridley, 9393). I have not seen a type specimen, but I think the identification is correct. The petiole is, however, longer (1 inch long) than in the description.

110. *H. AURICULARIA*, *L.*

On a high ridge between Telôm and the Batang Padang valley.

KLOSSIA, *n. gen.*

A herb with the habit of *Ophiorrhiza*. Stem simple or branched, hairy. Leaves herbaceous elliptic or lanceolate acuminate, in pairs, equal. Stipules green foliaceous ovate acuminate, free. Inflorescence of several three-flowered cymes on an erect terminal peduncle, with ovate foliaceous bracts, congested into a small capitulum. Calyx short campanulate, with five blunt obovate lobes. Corolla white tubular, much

longer than the calyx, lobes five, shorter than the tube. Stamens four included; filaments long, but free only in the upper part of the tube; anther linear oblong. Style cylindrical, stigma of two large elliptic lobes. Capsule urn shaped, two celled, many seeded, seeds subquadrate brown punctate. One species in Malay Peninsula.

111. *K. MONTANA*, *n. sp.*

Whole plant 6-18 inches tall, often branched, stem hairy. Leaves elliptic to lanceolate acuminate, base narrowed to the petiole, dark green above, whitish beneath, glabrous except for a few scattered hairs above, beneath red scurfy pubescent on the nerves; nerves 13 pairs, conspicuous beneath slender, meeting in intra-marginal loops, $3\frac{1}{2}$ inches long, $1\frac{1}{4}$ inch wide; petiole red hairy, $\frac{1}{4}$ -1 inch long. Stipules, $\frac{1}{2}$ inch long, ovate cuspidate foliaceous, green. Peduncle red hairy, $1\frac{1}{2}$ inch long. Cymes three flowered, several in a head, with ovate green bracts glabrous. Calyx campanulate glabrous lobes five, obovate and unequals deeply separated green. Corolla, $\frac{1}{4}$ inch long, glabrous white, tube narrowed in the middle dilate upwards, hairy in the mouth, lobes short. Stamens four; filaments running along the tube wall and adnate to it for most of their length; anthers fairly large. Style and stigma nearly as long as the stamens. Capsule, $\frac{1}{8}$ inch long, glabrous. Disc elevated.

Telôm, abundant in the forests in wet spots by streams. Also met with in Selangor at Ginting Bidei, and on Bukit Hitam (Ridley, 7411), and on the Track to Semangko Pass from Kuala Kubu.

This cannot, I think, be referred to *Hedyotis*, though it somewhat resembles *H. stipulata* on account of the form of the corolla; the stipules and bracts are peculiar, being quite foliaceous. In habit it resembles *Ophiorrhiza*, but the capsule is different.

112. *OPHIORRHIZA ERUBESCENS*, *Wall.*

Telôm and Gunong Berumban.

I take this to be the plant intended by King in his description; but a plant distributed by him under this name (Perak *Kunstler*, 5853) and quoted in the "Materials" is a small plant with hairy leaf margins, and not a completely glabrous plant except for the inflorescence, as he describes *O. erubescens*. The Telôm plant is our largest species, tall with broad glabrous leaves. Flowers, $\frac{1}{2}$ inch long, white, and large capsules. It occurs also in Penang.

O. erubescens is also a native of Burmah.

113. *O. HISPIDULA*, *Wall.*

Telôm.

114. *O. MUNGOS*, *L.*

Telôm. If all the plants from India, Ceylon and the Malay Peninsula that are classed as *O. mungos*, *L.*, are specifically identical, the plant is indeed, as King says, very variable.

115. *O. RUGOSA*, *Wall.*

On Gunong Berumban and in the Batang Padang valley.

Distrib.—Himalayas.

116. *ADENOSACME LANCEOLATA*, *n.^a sp.*

Shrublet, about 2 feet tall, stem glabrous pale, shining with distant nodes. Leaves few terminal lanceolate acuminate, narrowed gradually at the base, 8 inches long, $2\frac{1}{2}$ inches wide or less, herbaceous entire glabrous except that the midrib on the back is scabrid: nerves 16 pairs, visible above, conspicuous beneath, ascending to the margin, forming intra-marginal loops; petiole 1 inch long. Flowers in lax cymes from the nodes of the bare part of the stem two or three together; peduncles slender, $\frac{1}{2}$ inch long, bearing each three pedicels, each with one or two flowers: pedicels $\frac{1}{4}$ inch long; all pubescent. Bracts linear acuminate, $\frac{1}{10}$ inch long. Calyx cupular, $\frac{1}{10}$ inch long, with five to six linear acuminate lobes, scabrid. Corolla yellow, tube slender cylindric, $\frac{1}{4}$ inch long, lobes five, short oblong ovate, all glabrous, but tube slightly scabrid. Stamens five, in the mouth of the tube anthers oblong, almost sessile. Style stout as long as the stamens, stigma bilobed lobes broad elliptic. Fruit, $\frac{1}{4}$ inch long, subglobose, crowned with the sepals.

Telôm, damp spots by the streams. This belongs to the group of *A. Scortechinii*, King and Gamble, but is a more slender plant, with very different leaves.

117. *A. FLAVA*, *n. sp.*

Shrub, 2 or 3 feet tall, stem woody, hollow $\frac{1}{4}$ inch through, leafy only at the tip. Leaves thin obovate, abruptly acuminate, narrowed gradually to the base, 12 inches long, 5 inches wide or less, glabrous above, midrib and nerves rufous, hairy beneath; nerves about 15 pairs, nearly straight, meeting within the margin, nervules nearly vertical. Cymes short, pubescent on the old wood crowded, about 1 inch long; pedicels short. Calyx urn shaped, with five lanceate cuspidate teeth nearly as long as the tube, pubescent, $\frac{1}{10}$ inch long. Corolla yellow, cylindric dilated above pubescent, hairy outside and in, lobes four, oblong rounded, little shorter than the tube. Stamens five, anthers linear oblong in the mouth of the tube. Style short, straight, hairy at the base. Stigmas two, filiform. Telôm woods by stream banks. This plant is certainly allied to and resembles *A. Scortechinii*, King, but I think it must be distinguished. The flowers in

A. longifolia, Wall., are di- or trimorphic in the matter of stamens and style, and it may so be in *Scortechinii*. In that species the stamens are sessile in the base of the tube and the style five armed. In this the stamens are in the tube mouth and the style arms two. The *Scortechinii* group require careful study in the woods, but unfortunately they are by no means common.

118. *UROPHYLLUM TRIFURCUM*, *Pears.*

Telôm Camp. A large shrub, with large showy orange-coloured fruits.

119. *U. MACROPHYLLUM*, *Korth.*

Forests at Telôm.

120. *BRACHYTOME SCORTECHINII*, *King and Gamble.*

Flowers small, white. Telôm on the banks of a stream above the camp.

GARDENIA (§ *GARDENIELLA*), *new section.*

Dwarf shrublets, little or not branched, unarmed, often pubescent. Leaves opposite, stipules ovate, ending in slender points. Flowers one to three on short peduncles from the lower part of the stem below the leaves (*i.e.*, where the leaves have fallen). Calyx tube cylindric, slender, lobes very narrow setaceous. Corolla tube elongate, gradually dilating upwards, green or creamy yellow with red spots. Stamens included, forming a cone round the style. Capsule elongate cylindric, narrow, pendulous, crowned with the narrow linear sepals. Seeds numerous, minute, oblong, not flattened, pustulate. Species three. Malay Peninsula.

The plants of this section are so utterly unlike those of a typical *Gardenia* that were it not for a connecting link in the form of *Gardenia tentaculata*, Hook. fil., one would have no hesitation in proposing a new genus for them. The plants have the habit of a *Didymocarpus* or *Didissandra*. The flowers borne below the leaves, on the lower bare part of the stem, are of fairly large size, yellow to green with pink streaks, gradually dilated upwards after the manner of *G. Rothmannia*, but much smaller. The stamens and style are those of a typical *Gardenia*, but the fruit is long slender and cylindric with innumerable dry seeds of a minute size, rounded oblong, and pustulate. This form of seed is quite characteristic of the small half shrubby plants which grow on the hill slopes in the Malay forests, such seeds being dispersed by rain water. *Gardenia tentaculata*, Hook. fil., is a bush which grows in tidal mud, on most of our rivers, and is referred to the section *Rothmannia* by Hooker. It resembles these hill plants, in its green red-spotted flowers borne in the lower axils of the branches, the shape of the corolla

and narrow sepals. Its fruit, however, is swollen and oblong, resembling that of typical *Gardenias*; and its seeds are much larger and flattened, but like those of *G. pulchella* are brown and pustular, it being a plant whose seeds are dispersed by water.

121. *GARDENIA* (§ *Gardeniella*) *PULCHELLA*, *n. sp.*

A shrublet, with a woody erect stem, about 2 feet tall or less, $\frac{1}{8}$ - $\frac{1}{4}$ inch through, brown, hairy. Leaves thin oblanceolate, subacute or acuminate, glabrous above, pubescent on the nerves beneath; nerves seven to nine pairs, inconspicuous above, elevated beneath, ascending gradually to the margin, 6-7 inches long, $2\frac{1}{2}$ -3 inches wide; petiole $1\frac{1}{2}$ inch long. Internodes $1\frac{1}{2}$ -2 inches long. Stipules large, ovate, ending in a number of setaceous points, $\frac{1}{2}$ inch long. Flowers solitary or three or more on a short $\frac{1}{4}$ -inch peduncle from a leaf axil on the denuded base of the stem. Pedicels very slender, $1\frac{1}{2}$ -2 $\frac{1}{2}$ inches long, pubescent. Calyx tube slender, cylindric, about 1 inch long, lobes linear acute, $\frac{1}{2}$ - $\frac{3}{4}$ inch, green, pubescent. Corolla $2\frac{1}{2}$ inches long, base cylindric slender, gradually dilated upwards to the limb, which is $\frac{1}{2}$ inch across, five lobes, short rounded, creamy white outside, densely spotted streaked with red inside, tips of lobes cream with a violet spot at the apex, all glabrous. Stamens included, fuscous, connivent: filaments long, slender, free nearly to base; anthers linear acuminate. Style short thick, stigma clubbed. Capsule pendulous, cylindric, obscurely angled, glabrous, $1\frac{1}{2}$ inch long, $\frac{1}{8}$ inch through, crowned with the sepals, two celled, seeds oblong-pustular brown minute, very numerous.

Common on banks at Telôm.

This curious and pretty plant is certainly extremely unlike a typical *Gardenia* and very different from *G. Rothmannia*, Thunb., the type of the section. In many points, however, it is closely allied to *G. tentaculata*, Hook. fil., a common tidal swamp plant, especially resembling it in its small size, axillary flowers from old leaf axils, its long narrow sepals, and the colour of its flowers. The long slender capsule with its oblong rounded seeds, and elongate corolla tube, however, separate it widely from that species. Were it not for this connecting link one would certainly propose a distinct genus for this plant and its allies. I have met with two other species of this section in the Peninsula, one of which Pearson named *Acranthera didymocarpus*, but I cannot find that any description of it was published. The genus *Acranthera*, however, contains only plants with strongly-peduncled terminal cymes, and is allied to *Mussaenda*, to which genus one species has been referred.

122. *G. DIDYMOCARPUS*, *n. sp.**Acranthera didymocarpus*, Pearson MSS.

Shrublet, with a stem 2 or 3 inches tall, densely hairy. Leaves oblong, or oblong ovate acuminate, narrowed slightly at the base, hairy all over with long soft hairs, especially on the margins and keels; nerves inconspicuous above, 7 to 10 pairs, 6-7 inches long, 2 inches wide; petiole 1 inch long or less. Stipules lanceolate acute, densely hairy. Flowers from the bare part of the stem solitary or in threes, with four or five linear acuminate hairy bracts, $\frac{1}{4}$ inch long, on the very short peduncle. Calyx lobes five or six linear acuminate, 1 inch long, hairy. Corolla campanulate, base of tube shortly cylindric, then dilating hairy outside and especially on the edges of the lobes, 2 inches long and over 1 inch across, yellow with pink spots in the tube, lobes rounded five or six. Stamens connivent, included five or six, anthers linear, $\frac{1}{2}$ inch long, filaments as long. Style thick, stigma fusiform. Capsule nearly 1 inch long, cylindric hairy on $\frac{1}{2}$ -inch pedicel and crowned with the long persistent sepals.

Selangor at Ginting Bidei, and Bukit Kutu at 2,000-3,000 feet altitude (Ridley, 7573), and on the Raub track at the 15th mile from Kuala Kubu.

123. *G. VIRESCENS*, *n. sp.*

Stem woody over 1 foot tall, scabrid hairy on the young parts. Leaves in remote pairs, thin, broadly lanceolate or elliptic lanceolate, 5-6 inches long, 2 inches wide, glabrous above except for some scattered fugacious very small hairs, beneath shortly scabrid hairy on the nerves and midrib; eight pairs of nerves; petiole 1 inch long, slender, glabrous. Stipules ovate fringed with long points, $\frac{1}{4}$ inch long. Flowers solitary or in pairs from the axils, usually below the leaves. Peduncles, $\frac{1}{2}$ - $\frac{3}{4}$ inch long, slender, scurfy hairy. Calyx lobes linear, acuminate, scurfy hairy, $\frac{1}{3}$ inch long. Corolla tube, 2 inches long, glabrous, cylindric for nearly half its length, then dilated mouth $\frac{1}{2}$ inch across, lobes short, undulate, green with pink spots. Stamens $1\frac{1}{2}$ inch long.

Perak, Taiping Hills, near the "Cottage," only a single plant seen in 1891.

124. *TIMONIUS DIFFUSUS*, *n. sp.*

A big tree, much branched with slender twigs. Leaves thin glabrous, broadly lanceolate acuminate, almost equally acuminate at both ends, 4-6 inches long, 2 inches wide; nerves eight pairs, curved up to the margin, slender, most conspicuous on the lower surface; petiole $\frac{3}{4}$ inch long. Stipules linear acumi-

nate, cuspidate, very narrow, $\frac{1}{2}$ inch long. Cymes very lax and slender; peduncle $2\frac{1}{4}$ inch long, filiform, glabrous; branches few, very slender, 1 or 2 inches long. Flowers sessile at the fork and ends of the cyme-branch. Male flower, calyx funnel shaped, with five short teeth, $\frac{1}{10}$ inch long, glabrous. Corolla tube slender cylindric, a little over $\frac{1}{2}$ inch long, pubescent, yellow, lobes four, short obtuse lanceolate, pubescent, not a quarter of the length of the tube. Stamens four, long narrow, linear almost sessile. Female flower on solitary axillary pedicels, $1\frac{1}{2}$ inch long, $\frac{1}{2}$ inch wide, ovary obovate, glabrous. Calyx lobes four, very short, ovate. Corolla $\frac{1}{10}$ inch long, silky tomentose, lobes as long as the tube, ovate, short, four, fleshy, channelled inside. Staminodes thin flat four. Style short thick. Stigma bilobed, lobes fleshy. Fruit $\frac{1}{2}$ inch long, ovoid globose, top flat, four lobed.

Telôm, very common in forests. A big tree for a *Timonius*. The plant is evidently allied to *T. laras*, King and Gamble, but differs in its being almost completely glabrous, with the corolla tube of the male flower only slightly pubescent outside and quite glabrous within, and with very short lobes in proportion to the tube. On one cyme I find the flower replaced by a rosette of lanceolate leaves, the longest, $\frac{1}{2}$ inch long, strongly hairy on the edges and keel.

125. WEBERA PULCHRA, n. sp.

A large-spreading shrub. Leaves broadly lanceolate or oblanceolate to nearly obovate, rather abruptly acuminate, base cuneate, or gradually acuminate, thin (drying black), glabrous, 3-9 inches long, $1-3\frac{1}{2}$ inches broad; nerves 12 to 14 pairs, slender gracefully curved, elevated on both sides when dry; petiole $\frac{3}{4}$ inch long. Stipules stiff, linear, $\frac{1}{4}$ inch long. Panicles lax spreading, of four or five branches, $1\frac{1}{2}$ -3 inches long, on a peduncle of 1 inch long or less, bearing lax terminal cymes about 1 inch long; flowers on short pedicels, $\frac{1}{4}$ inch long. Buds cylindric, $\frac{1}{2}$ inch long. Calyx campanulate, with four short points, $\frac{1}{10}$ inch long. Corolla white $\frac{1}{2}$ inch long, the tube slightly dilated upwards, $\frac{1}{4}$ inch long, lobes linear oblong, a little longer, all glabrous, except for a ring of white hairs in the mouth. Stamens exserted, anthers linear, narrow. Style as long. Stigma linear, slightly dilated upwards, ending in a point. Fruit $\frac{1}{2}$ inch through, one seeded, pericarp rather fleshy, dull grey green. Seed subglobose, with an excavate base.

This beautiful shrub, with its conspicuous ivory white flowers, was abundant all about Telôm up all the water-courses, and by the cascade. Its affinity seems to be with *W. grandifolia*.

126. *W. SALICINA*, *n. sp.*

A large shrub. Leaves elongate, lanceolate, narrow acuminate, almost equally to both ends, glabrous; nerves eight pairs, ascending and ending in loops at the margins, 6-8 inches long, 1-1½ inch wide; petiole winged for most of its length, ½ inch long. Stipules lanceolate obtuse, cymes axillary opposite; peduncle 3 inches long; branches few, slender, 1½ inch long; pedicels very slender, filiform, 1½ inch long, bearing a single white flower. Calyx tube obconic, minutely pubescent, limb shorter, nearly entire, cup shaped, ½ inch long, glabrous. Corolla white, ½ inch long, base dilate shortly, tube abruptly narrowed, lobes wider, linear oblong, four, glabrous subobtusate, longer than the tube. Stamens four, anthers long, linear nearly as long as the corolla lobes, apiculate. Style stout, pubescent, almost as long as the stamens. Stigma bilobed, lobes elliptic, flat. Fruit globose ovoid, ½ inch long, seeds two. Telóm Water-fall. An elegant shrub remarkable for its long narrow leaves and diffuse cymes.

127. *W. NAPIERII*, *n. sp.*

A shrub. Leaves elongate, lanceolate acuminate, narrowed to the base, thinly coriaceous, glabrous above, hairy beneath, especially on the nerves and nervules, 7-12 inches long, 2½-4 inches wide; nerves 8 to 12 pairs, elevated on the lower surface; petiole 1½-2 inches long, hairy. Stipules triangular acute, hairy, ¼ inch long. Peduncle 6-8 inches long, pendulous, bearing at the end about four cymes, compact in a head, 1 inch long (more lax in fruit), very hairy. Calyx five lobed, densely covered with hairs. Corolla white, ½ inch long, hairy, lobes four oblong obtuse, about half the length of the tube. Stamens four as long as the lobes, glabrous, anthers linear apiculate. Style much longer than the corolla. Stigma very slender narrowed at both ends. Fruit globose, greenish grey.

Negri Sembilan at Bukit Tanga, near Seremban (W. G. Napier), Telóm (in fruit).

This species is most nearly allied to *W. longifolia*, Hook. fil., differing in its much larger and more hairy leaves, and long hairy peduncle bearing densely clustered hairy cymes. The only flowering specimen I have seen was obtained by Sir W. G. Napier, who made a small collection of plants near Seremban, after whom I name the plant.

128. *IXORA GRANDIFOLIA* var. *ARBORESCENS*.

Slopes of Gunong Berumban. A tree with smaller leaves than usual in this species.

129. *I. PENDULA*, *Wall.*

Near Telôm Camp. A shrub with the corolla tube pink and the lobes white. The leaves are broader and thinner than in the common low-country form.

130. *PÆDERIA VERTICILLATA*, *Bl.*

On the road side at the 12th mile from Tapah. The flowers only in bud, the whole flower spray of a rich deep purple. Not rare all over the Peninsula and in Borneo.

131. *SAPROSMA SCORTECHINII*, *King and Gamble.*

Woods at Telôm, in flower and fruit.

132. *HYDNOPHYTUM FORMICARIUM*, *Jack.*

Telôm, a mile from the camp, towards Batang Padang. A narrow-leaved form.

133. *GEOPHILA RENIFORMIS*, *Don.*

Ulu Batang Padang.

Distrib.—Most of the tropics.

134. *LASIANTHUS MYRTIFOLIUS*, *n. sp.*

A tall shrub, lower part of the branches pale, younger parts pubescent, drying black, branches slender. Leaves coriaceous lanceolate acuminate, base cuneate, nerves and nervules elevated on both surfaces, glabrous, shining above; nerves beneath (much raised) pubescent, $\frac{1}{2}$ -1 inch long, $\frac{1}{4}$ to nearly $\frac{1}{2}$ inch wide; petiole pubescent, $\frac{1}{10}$ inch long. Stipules shorter, acuminate, pubescent. Flowers very small, one or two sessile in the axil of a leaf. Bracts minute, ovate. Calyx very short, pubescent, campanulate, four lobed, lobes short, blunt four. Corolla $\frac{1}{2}$ inch long, white, cylindric, with four linear lobes, obtuse, pubescent without, and white hairy within, lobes shorter than the tube. Stamens four, anthers nearly sessile, oblong with two short points at the base. Style shorter than corolla tube, rather stout. Stigmas very minute.

Telôm Ridge at 5,000 feet. A very distinct plant in habit and foliage.

135. *L. SALICIFOLIUS*, *n. sp.*

Bush, branches slender, thickly covered with felted hair. Leaves narrowly lanceolate, ending in a long point, base shortly narrowed subcuneate or rounded, thin herbaceous, drying black, pale olivaceous beneath, glabrous above, except the midrib and veins covered with yellow hairs, closely appressed beneath, midrib, nerves and nervules elevated densely yellow hairy; nerves ascending 13 pairs, 4 inches long, $\frac{1}{2}$ inch wide; petiole $\frac{1}{4}$ inch long, hairy. Stipules

hairy. Flowers one or two axillary, sessile. Calyx campanulate, $\frac{1}{2}$ inch long, with five acute points, hairy. Corolla $\frac{1}{10}$ inch long, hairy, dilated at the base, narrowed upwards, limb dilated with five ovate lobes, much shorter than the tube. Fruit globose, hairy, $\frac{1}{4}$ inch long, crowned with the sepals. Telôm Ridge.

136. *L. RHINOCEROTIS*, Bl.

A large shrub or almost a tree, the biggest species I know. The flowers are pale rose-pink. All the other species in the Peninsula have white flowers.

137. *L. CONSPICUUS*, n. sp.

Shrub, about 6 feet tall, glabrous. Leaves lanceolate or oblong lanceolate, abruptly acuminate, with a broad base, very shortly narrowed, 5-7 inches long, $1\frac{1}{2}$ -2 inches wide, thin textured, drying dark brown or black; nerves inconspicuous above, elevated beneath, eight or nine pairs, gradually ascending to the margin, not meeting in loops; petiole $\frac{1}{10}$ inch long. Stipules small lanceate, base broad. Bracts linear glabrous. Cymes shorter than the petioles or little longer. Flowers several. Calyx campanulate, hardly toothed. Corolla white cylindric, $\frac{1}{2}$ inch long, lobes five nearly half as long as the tube, all glabrous, except the strong tuft of white hairs in the mouth. Fruit small ovoid, $\frac{1}{4}$ inch long, crowned by the five-toothed calyx, pyrenes five.

Telôm, common and conspicuous in the forests from its quite large showy white flowers.

This resembles *L. Lowianus*, but has a totally different venation of the leaves, the shape and petiole of which are quite different and the fruit is not angled and has five pyrenes.

138. *L. HIETUS*, n. sp.

Shrub, branches densely hairy, with brown hairs. Leaves lanceolate acuminate, with a long point, nearly sessile, $4\text{--}4\frac{1}{2}$ inches long, $\frac{3}{4}$ -1 inch long, hairy on both surfaces; nerves 10 pairs, indistinct above and impressed, midrib fringed with long yellow hairs, and the rest of the leaf covered rather thickly with yellow hairs, beneath nerves elevated, nervules conspicuous, all hairy; petiole $\frac{1}{10}$ - $\frac{1}{4}$ inch hairy. Cymes shorter than petiole, densely hairy. Stipules lanceolate acute hairy and stippled with longer hairs. Calyx lobes five, densely hairy. Corolla not seen. Fruit small, $\frac{1}{10}$ inch long, hairy at first eventually glabrous, crowned by the densely hairy sepals, pyrenes four.

Telôm Forests.

This species is near *L. densifolius*.

139. *L. PERAKENSIS*, King and Gamble.
Telôm.

140. *L. LOWIANUS*, King and Gamble.
Telôm.

141. *L.* (§ *LITOSANTHES*) *GRACILIS*, King and Gamble.

Litosanthes biflora, Bl. (Bijdr., 994). A specimen of a plant received from Buitenzorg under the name *Litosanthes biflora*, Bl., and agreeing with Blume's description, is absolutely identical with the plant distributed by King as *Lasianthus gracilis*.

142. *LASIANTHUS* (*LITOSANTHES*) *PENDULA*, *n. sp.*

A tall shrub, 6 or 8 feet high, with long pendulous branches, densely hairy. Leaves lanceolate acuminate, sessile or nearly so, petiole very short, base rounded, apex cuspidate, coriaceous, above glabrous and shining beneath, densely hairy; nerves eight pairs, much elevated beneath, depressed above, nervules transverse, 3-4 inches long, 1-1½ inch wide. Stipules lanceolate linear, densely hairy. Peduncles one in each leaf axil, hairy, 1½ inch long, bearing three or four flowers surrounded by a number of filiform long hairy bracts, ½ inch long. Calyx short with five long lanceate subulate hairy sepals. Corolla short, glabrous outside and inside white, tube nearly as long as the lobes. Stamens five, anthers linear oblong. Style little longer, stout. Stigma broad, trincate bilobed. Fruit ½ inch long, obovate, narrowed to the base, five lobed, and crowned with the five hairy calyx lobes.

Gunong Berumbau at 6,000 feet.

A very curious plant with long-hanging branches very hairy and with the young parts tinted with violet, very distinct from any other species in the section.

143. *L.* (*LITOSANTHES*) *ROBINSONII*, *n. sp.*

A tall shrub, stems pubescent, internodes 3 inches long. Leaves elliptic, rather thin, acuminate, slightly narrowed to the obtuse base, glabrous above, beneath hairy on the nerves, nearly sessile; nerves depressed above, elevated and conspicuous beneath, eight pairs, ascending gradually to the margin, nervules subhorizontal elevated hairy, 5 inches long, 2 inches wide; petiole 1/10 inch pubescent. Flowers one to three, sessile on the end of a long filiform peduncle. Peduncle 2 inches long, hairy. Bracts two, subulate hairy. Calyx 1/10 inch long, tube short, teeth elongate subulate longer, densely hairy, four. Corolla ¼ inch long, hairy outside and in, tube very short, lobes longer, oblong, rounded at the tip. Stamens four,

glabrous linear, included. Style shorter than corolla, stout. Stigma obovate flattened retuse papillose. Fruit (unripe) obovoid very hairy and crowned with the long linear sepals.

Telôm, abundant.

This is allied to *L. scalariformis*, King and Gamble, but differs in its pale leaves, hairy nerves, peduncle and calyx.

144. *PSYCHOTRIA BRACHYBOTRYS*, n. sp.

Scandent with slender stems, $\frac{1}{10}$ inch through. Leaves lanceolate coriaceous, acuminate obtuse, base acuminate, glabrous, minutely black dotted and dark green or black when dry, $1\frac{1}{2}$ -2 inches long, by $\frac{3}{4}$ inch wide; petiole $\frac{1}{4}$ inch long; nerves four pairs, inconspicuous. Stipules short and ring shaped with two short points. Cymes very short, $\frac{1}{4}$ inch long in flower, lengthening in fruit, terminal almost completely glabrous. Flowers very shortly pedicelled, $\frac{1}{10}$ inch long. Bracts linear obtuse. Calyx very short, cup shaped, five lobed, lobes very short pubescent. Corolla very short, lobes five, pubescent outside, hairy within the tube. Stamens five, anthers oblong obtuse, longer than the short filaments. Style short. Stigma bilobed. Fruit on lengthened pedicels ($\frac{1}{4}$ inch long) and cyme branches lengthened to half an inch, elliptic pyriform, $\frac{1}{8}$ inch long (unripe); pyrenes three, ribbed.

Gunong Berumban at 6,000 feet elevation, and also met with on the Semangko Pass, Selangor (Ridley, 12072).

This species is allied to *P. Scortechinii*, King, differing in the smaller leaves, short cyme and coriaceous leaves.

145. *Ps. FULVA*, Buch. Ham.

Sporadic in woods, Telôm. It also occurs in the Taiping Hills. The very small flowers are pinkish white and the fruit orange.

146. *Ps. VIRIDIFLORA*, Bl.

A variety with rather larger and thinner leaves. A bush, Telôm.

147. *Ps. CONDENSEA*, King and Gamble.

Gunong Berumban. I only got a few scraps of this plant in bud. It appears to be the plant intended under this name, but the flowers have not been described, and I have not seen fruit.

148. *Ps. ANGULATA*, Korth.

A single specimen of what appears to be a form of this common wide spread plant was obtained on Gunong Berumban.

149. *CHASALIA CURVIFLORA*, Thw.

Common in woods, Telôm. The form much resembled the ordinary low-country one.

150. *CHASALIA MINOR*, *n. sp.*

Shrub or bush, stems woody. Leaves small, lanceolate acuminate thin, narrowed to the base, $3\frac{1}{2}$ inches long, $\frac{1}{2}$ inch wide, glabrous, margins faintly undulate; nerves six pairs. Cymes terminal, short with three slender-spreading branches, about $\frac{1}{2}$ inch long, bearing three flowers on the end of each. Flowers white, shortly $\frac{1}{10}$ inch pedicelled. Calyx funnel shaped with five short-rounded lobes. Corolla tube short, dilated slightly upwards, $\frac{1}{4}$ inch long, curved, lobes five, lanceolate acute half as long, three nerved. Stamens four, protruding from the mouth, anthers linear, rather large. Style cylindric, stigmatic, lobes oblong, two. Disc cushion shaped. Fruit black, $\frac{1}{2}$ inch long, two celled, two seeded, seeds plano-convex.

Gumong Berumban. A very different plant from any form of *Chasalia curriflora* from the plains, variable though that is. It is much more of a spreading bush with slender twigs. The flowers are smaller, the tube much shorter in proportion to the lobes, and the pedicels not swollen and fleshy either in flower or fruit.

151. *CEPHAELIS CUNEATA* var. *ELLIPTICA*

A small plant than usual with elliptic leaves, acuminate at the apex and narrowed at the base, thin in texture, and 4 inches long, $1\frac{1}{2}$ inch wide; nerves 10 pairs; petiole $\frac{1}{2}$ inch long, stipules thinly coriaceous acuminate; peduncle 2 inches long. Telôm Woods, sporadic and nearly all in fruit at the time.

I think this is a distinct species, but the whole genus, as far as the Peninsular species go, requires revising. Three species are given in the "Materials," and of these there seem some doubts about. There are, however, certainly more species, but these fleshy plants preserve ill, and are somewhat difficult to separate when dry.

COMPOSITE.

152. *VERNONIA CINEREA*, *Less.*

Telôm, in Sakai clearings, and by the river bank. The latter a tall much branched form.

153. *ADENOSTEMMA VISCOSUM*, *Forst.*

Telôm, abundant in a wet spot along the track, and in open spaces round the camp. It was also found far up in the region of Cameron's plateau, apparently indigenous. It is also to be met with along the track to Jor in the Batang Padang valley. The variety round Telôm is very different from the ordinary Malay Peninsular form, and I cannot fit it into any of the varieties mentioned by Clarke in the *Compositæ*

indica. It is about 18 inches tall, with a large lax-spreading panicle, 8 inches across. The branches which, as well as the stem, are viscid-pubescent, are slender. The leaves are thin, glabrous, ovate acuminate, narrowed at the base and decurrent on the petiole, and the margin is almost completely entire, occasionally obscurely serrate, 6 inches long, and 3 inches wide. The heads are $\frac{1}{8}$ inch across, involucre glabrous. Flowers pure white. The fruits are perfectly smooth, and not at all muricate, covered with glands, exuding a viscid gum and very adhesive. It seems to be nearest to the var. *microcephala*.

The plant, which is very variable in form, is distributed all over the tropics, and usually occurs as a village weed. I never saw it looking so thoroughly wild as I did at Telôm.

154. *AGERATUM CONYZOIDES*, L.

Telôm, in a Sakai clearing.

155. *MIKANIA SCANDENS*, Willd.

Telôm, Sakai clearing.

Distrib.—Common in the Peninsula, Tropical Africa and Indo-Malaya.

156. *MICROGLOSSA VOLUBILIS*, Dc.

Telôm, not common in the Peninsula. I have it from Hermitage Hill, Perak, and from Chabau in Malacca. It has also been collected in Penang, and is met with in India, Burmah and the Malay islands and China.

157. *BLUMEA BALSAMIFERA*, Dc.

Telôm, Sakai clearing.

158. *BL. SPECTABILIS*, Dc.

Ulu Batang Padang, on the track, common on banks in the hills. I have it from Selangor, Ginting Bidei and Kuala Lumpur; Sungei Ujong and also from Christmas Island.

159. *GYNURA SARMENTOSA*, Dc.

Telôm, on trees near the camp. A common forest plant all over the Peninsula in wet jungle, also occurring in Siam and the Malay islands.

160. *G. BICOLOR*, Dc.

A weed, abundant in the Sakai clearing at Telôm.

Distrib.—Malay islands and China.

161. *G. PSEUDOCHINA*, Dc.

With the last but less abundant.

162. *SIEGESBECKIA ORIENTALIS*, L.

In an abandoned clearing near Telôm. This is by no means common in the Peninsula, and I have only seen it of late years in Singapore, where it appeared as a garden weed.

163. *BIDENS PILOSA*, *L.*

Telôm Camp and in Sakai clearings, the variety *pilosa* proper, with white ray-florets.

CAMPANULACEÆ.

164. *LOBELIA AFFINIS*, *Wall.*

Ulu Batang Padang; Telôm. I found a very small-flowered form of this with white flowers and a glabrous calyx, growing in very wet mud in the forest at Telôm. The species seems to vary a good deal. It is common in damp muddy spots, usually in open places all over the Peninsula.

165. *PENTAPHRAGMA BEGONIÆFOLIUM*, *Wall.*

Telôm, banks in the forests. This species occurs, too, in Penang and Perak and at Telôm. The locality Singapore, (*Lobb*) in the "Materials," is obviously an error; Lobb no doubt got it in Penang, and the locality quoted from Tahan collected by me is also an error, the Tahan plant being *P. Scortechinii*.

166. *P. SCORTECHINII*, *King and Gamble.*

Telôm. The flowers of this are quite white, and not yellowish with violet spots in the tube as in *P. Ridleyi*; King and Gamble give Singapore, Bukit Timah, as a locality for a variety of *P. Scortechinii*. The species does not occur there, the only plant there is *P. Ridleyi*.

VACCINIACEÆ.

167. *VACCINIUM SCORTECHINII*, *King.*

A compact bush. Gunong Berumban at 6,500 feet.

168. *V. VISCIFOLIUM*, *King.*

A bush, stems red, flowers pale rosy white. The spatulate coriaceous leaves easily distinguish it. The specimens described were flowerless, so that the flowers have never been described. They are borne in racemes, $1\frac{1}{2}$ inch long from below the leaves, axillary, pedicels $\frac{1}{2}$ - $\frac{1}{10}$ inch long decurved, glabrous. Calyx campanulate with six short ovate acute lobes. Corolla $\frac{1}{2}$ inch long cylindric, slightly dilated at the base with very short-rounded lobes rosy white. Stamens 10, filaments broad, tapering upwards, woolly, anthers oblong, with two long apical appendages clubbed and bifurcate at the tip, no basal appendages. Disc low subentire. Style stout glabrous.

Gunong Berumban, 6,000 feet.

169. *PENTAPTEGYGIUM SCORTECHINII*, *King and Gamble.*

On the summit of Gunong Berumban.

A beautiful shrub with its large cherry red calyx and corolla.

170. RHODODENDRON TEYSMANNI, *Miq.*

An epiphyte on the high ridge behind Telôm Camp.

I think *R. Teysmanni* should be kept as a distinct species from *R. javanicum* as Miquel put it. It differs apparently constantly from *R. javanicum* in its colour, pubescent ovary, and hairy bases of the stamens.

171. RH. WRAYI, *King.*

Bush, on Telôm Ridge and Gunong Berumban, in fruit. There seem to be two forms, possibly species, of this. The typical plant is a shrub about 4 or 5 feet tall with very coriaceous lanceolate or oblong leaves, rather short, white beneath. Flowers white spotted with red on the surface inside the mouth with orange red stamens. This occurs in Perak and on the Hulu Semangko Ridge, where Mr. Burn-Murdoch and myself found it.

The other var. *elliptica*, *n. var.*, is a large shrub or small tree, 15 feet tall, with longer and narrower leaves elliptic coriaceous, and pale (but not white beneath). The flowers pure white unspotted. This occurs with the other variety on Hulu Semangko, where Mr. Burn-Murdoch collected it, and is the plant I obtained on Gunong Berumban and also on the Telôm Ridge, and Mr. Robinson got it on Gunong Taban. Mr. Burn-Murdoch considered that the two plants on Hulu Semangko were quite distinct specifically and perhaps they should be separated.

172. R. JASMINIFLORUM, *Hook. fil.*, var. PUNCTATA.

Straggling shrub, epiphytic with ovate nearly sessile leaves very coriaceous. Flowers rather smaller than in the type, white with bright pink spots in the mouth of the tube; pedicels pubescent slender, 1 inch long.

Telôm Ridge; Taiping Hills (Ridley) and probably all the Perak plants mentioned by King and Gamble in the "Materials." The type of *R. jasminiflorum* was the plant obtained on Mt. Ophir by Lobb, and figured in the "Botanical Magazine," t. 4, 524. It appears to be peculiar to Mt. Ophir, where it has often been collected—viz., by Lobb, Griffith., Maingay, Derry, No. 624, and by myself. It differs in the flower being pure white without spots, and the pedicels being thick and barely $\frac{1}{2}$ inch long, making the umbel very much more compact and giving the whole plant a very different appearance. The description in the "Materials" seems to be a mixture of these two plants, which seem distinct enough to merit varietal names at least.

173. *R. LONGIFLORUM*, *Lincl.*

Epiphytic at Telôm, in full flower. This is the plant found on lofty trees on Bukit Timah in Singapore and not *R. javanicum* as recorded in the "Materials." *R. longiflorum* has also been met with in Negri Sembilan, near Kuala Pilah, and is the only species which has been found in the low country. It occurs in Perak, also Borneo and Sumatra.

174. *RHODODENDRON KLOSSII*, *n. sp.*

A tall tree, 50 feet tall. Leaves opposite in pairs, whorled the ends of the branches, thinly coriaceous glabrous, dark green, very slightly paler beneath, lanceolate acute base, acuminate to the petiole, 4-4½ inches long, 1-1½ inch wide; nerves faint, reticulations visible, rather large, no scales; petiole ½ inch long. Flowers in three to six umbels terminal; peduncles ½ inch long, thick. Bracts numerous, lower ones small, ovate obtuse, upper ones lanceolate, ½ inch long, papery pale, margined with short white hairs. Pedicels slender, ½-1 inch long, glabrous. Calyx very small, nearly flat with fine very short lobes. Corolla tube cylindric about as long as the lobes, lobes oblong obtuse, whole flower 1½ inch long, white. Stamens nearly as long as the corolla 10, filaments slender filiform, anthers small oblong white. Style rather longer, capitate, ovary acuminate, glabrous. Gunung Berumban at 6,000 feet altitude.

A fine tree. The biggest tree Rhododendron I have seen in the Peninsula. There are usually only two flowers on each peduncle and six peduncles in the umbel, making a head of 12 flowers. The tree was in full flower, and most attractive in its mass of white blooms.

175. *RHODODENDRON LEUCOBOTRYS*, *n. sp.*

A shrub, 12-14 feet tall, with straight erect branches. Leaves lanceolate acute, narrowed a little to the base, but not acute, coriaceous 2½-3 inches long, 1 inch wide, quite glabrous and not scaly, smooth slightly paler beneath; nerves elevated beneath slender, 10 pairs; petiole ½ inch long or less. Umbels two to four terminal, peduncles very short ½ inch. Buds 1 inch long. Bracts ovate obtuse broad about ½ inch with ciliate margins. Flowers two to four in an umbel; pedicels 1 inch long, slender. Calyx very small, margins undulate, nearly flat. Corolla 1½ inch long, tube under ½ inch much shorter than the limb, campanulate lobes ¼ inch across, 1 inch long, subacute, white with a yellow spot in the throat. Stamens nearly as long as the lobes, filaments slender pubescent at the base for about a third of their length, above glabrous, anthers short oblong,

style longer, stigma capitate, pistil quite glabrous. Capsule fusiform, narrowed upwards, 1 inch long, $\frac{1}{4}$ inch through.

Kedah Peak. (Gunong Jerai) at 3,000 to 4,000 feet altitude, June, 1893. (Ridley, 5581).

This beautiful plant is apparently peculiar to Kedah Peak. I did not describe it before, as the part of the "Materials" dealing with this genus was not published. As, however, no description of it has appeared, I now describe it: It is allied to *R. Klossii*.

176. *R. ROBINSONII*, *n. sp.*

An epiphyte of no great size, growing usually on very lofty trees, branches pale below. Leaves in whorls of three, of which one is smaller than the others, blade coriaceous elliptic to lanceolate, obtuse to subacute, the smaller leaf lanceolate acuminate sometimes, glabrous, dark above, paler beneath; nerves about eight pairs, conspicuous above, hardly visible beneath, $3\frac{1}{2}$ -5 inches long, 2 inches wide; petiole thick, $\frac{1}{2}$ inch long. Flowers in a terminal umbel of five on a very short peduncle; pedicels $1\frac{1}{2}$ inch long, glabrous. Calyx very small and flat with very obscure rounded lobes. Corolla campanulate, 1 inch long, $1\frac{1}{4}$ inch wide, bright yellow, occasionally flushed with red. Stamens included, shorter than the corolla, nine, filaments filiform quite glabrous, anthers oblong, keel thick. Ovary glabrous style short, rather stout. Stigma capitate.

Common in the Telôm District from 3,400 to 5,000 feet on Gunong Berumban, growing often very high.

The shorter, broader, thicker leaves, smaller flowers, entirely glabrous, easily distinguish this pretty plant, which I am pleased to associate with Mr. H. C. Robinson.

177. *R. MALAYANUM*, *Jack.*

Epiphytic. Gunong Berumban and Telôm. Common at high altitudes all over the Peninsula.

178. *PERNETTYOPSIS MALAYANA*, *King and Gamble.*

Summit of Gunong Berumban, originally found by Wray on summit of Gunong Batu Puteh (7,000 feet) and by Scortechini.

179. *GAULTHERIA LEUCOCARPA*, *Bl.*

Gunong Berumban.

I am rather doubtful as to this identification, as the plant does not entirely agree with King's description, and I have seen no specimens or figures of the plant. It is a plant with long pendulous branches and aromatic foliage.

MYRSINÆ.

180. *MESA PERAKENSIS*, n. sp.

Small tree, with slender bright red brown branches. Leaves rather distant, elliptic-lanceolate, acuminate, margins crenulate with short teeth in the crenulations, 6 inches long, 2 inches wide; nerves rather inconspicuous above, seven pairs, elevated beneath and meeting in loops within the margin. Petiole $\frac{1}{4}$ inch long. Inflorescence usually racemose, occasionally shortly paniced, $\frac{1}{2}$ to nearly 1 inch long, few-flowered peduncle, and branches rufous velvety. Flowers minute, very short pedicelled, brown, calyx tube very short, wide, lobes five, ovate, acute, all pubescent. Corolla lobes five, pubescent, narrower and hardly longer than the calyx, tube much shorter than the lobes, stamens shortly protruded, anthers minute, ovary superior. Fruit small, $\frac{1}{10}$ inch long, red.

Telôm Woods.

This is a common plant in all our hill woods of over 2,000 feet and has been sent from the Taiping Hills under the numbers (Ridley, 3103, 5512, 10680, 11451; Curtis, 2090), but none of them are quoted by King or Mez in the "Materials" or the Monograph in the "Pflanzenreich." It seems very distinct from *M. indica*, the leaves being not dentate and the inflorescence red hairy. From *M. impressinervis* it differs in its larger leaves, pubescent raceme, acute petals and shorter tube to the corolla.

181. *M. RAMENTACEA*, Wall.

Batang Padang valley up to 2,000 feet altitude.

182. *EMBELIA RIBES* var. *RUGOSA*.

A form with rather larger leaves than usual and less pubescent inflorescence.

Telôm, near camp.

183. *E. CORIACEA*, Wall.

On Telôm Ridge and Gunong Berumban.

This plant is not rare in the low country. It is less usual to find it at such an altitude.

184. *E. MYRTILLUS*, Kurz.

Gunong Berumban, occurs on most of our higher hills.

185. *LABISIA PUMILA*, Benth, var. *LANCEOLATA*.

Woods, Telôm.

186. *LABISIA LONGISTYLA*, King and Gamble.

Sporadic on Telôm Ridge and Gunong Berumban.

This is described as undershrub, 2 feet tall, in the "Materials."

It is seldom so tall as this—in fact, I only know it as a dwarf plant, no bigger than *L. pumila*.

187. *ARDISIA CHRYSOPHYLLIFOLIA*, *King and Gamble*.

Gunong Berumban. I have seen no authentic specimen of this species, which was collected at Gunong Batu Puteh by Wray. The *Myrsineæ* of the Wray and Scortechini collection have not yet been distributed, or at least there are none in the Singapore Herbarium.

188. *A. COLORATA*, *Roxb.*

A tree on the lower slopes of Gunong Berumban and round Telôm. In fruit. This tree has larger and thinner, more elliptic leaves than usual.

189. *A. ROSEA*, *King and Gamble*.

Gunong Berumban. A form with narrower petals, stamens only half as long and blunt, but it varies somewhat according to exposure and altitude. Flowers pink.

190. *A. VILLOSA*, *Roxb.*

Telôm Woods. Common in the low country.

191. *A. THEÆFOLIA*, *King and Gamble*.

Bukit S'tempat on the lower slopes of Gunong Berumban.

192. *A. MAINGAYI*, *King and Gamble*.

A bush or small shrub, not a tree. Flowers pink.

Telôm Woods. I have also met with it in the Sempang Mines at the Senlangko Pass in Selangor.

193. *A. GLANDULIGERA*, *n. sp.*

Shrub, stems moderately stout. Leaves alternate, lanceolate to elliptic-lanceolate, long acuminate to acute, base acuminate, coriaceous-chartaceous, glabrous, entire, glands obscure, 6-7 inches long, 2-3 inches wide; petiole stout, $\frac{1}{2}$ inch long; nerves inconspicuous about 10 pairs, meeting in an intra-marginal vein. Inflorescence axillary, not longer than the petioles, on very short peduncles, $\frac{1}{4}$ inch or less long, thick, umbels of three flowers, pedicels $\frac{1}{2}$ inch long in flower, longer in fruit. Flowers pink, $\frac{1}{16}$ inch long, buds globose, bracts narrow, linear. Calyx lobes ovate subacute or obtuse, glabrous, densely gland dotted, slightly overlapping. Petals not seen. Drupe globular, dotted with prominent glands, $\frac{1}{8}$ inch long, bearing at the top the short filiform style.

Telôm. Unfortunately out of flower, but not identifiable with any known species.

SYMPLOCACEÆ.

194. *SYMPLOCUS PRUNIFLORA*, *n. sp.*

Tree about 25 feet tall, branches black when dry. Leaves lanceolate, acuminate glabrous, thinly coriaceous, narrowed at the base, but slightly (light green when dry) paler beneath; nerves four to six pairs, slightly elevated beneath, ascending

and meeting in extra-marginal curves, 4 inches long, $1-1\frac{1}{2}$ inch wide; petiole $\frac{1}{4}$ inch long. Inflorescence of two or three racemes in a cluster from the leaf axils, sometimes borne on a short peduncle, 1 inch long, scurfy brown. Flowers very shortly pedicelled. Bracts very small, lanceolate. Bracteoles two. Ovary and calyx $\frac{1}{8}$ inch long, scurfy, pubescent. Calyx lobes rounded, very small. Corolla white, $\frac{1}{4}$ inch across, tube very short, lobes rounded, cleft nearly to the base, glabrous. Stamens about 40, equal, obscurely connate at the base, filaments slender, glabrous as long as the corolla lobes. Anthers subglobular. Style very short, quite glabrous. Fruit ovoid, small, green (not ripe).

Telôm, a mile from camp towards Batang Padang. A pretty tree allied to *S. spicata*, Roxb., but with scurfy brown inflorescence and entire leaves.

195. *S. CURTISII*, *Oliv.*

Telôm.

OLEACEÆ.

196. *JASMINUM MAINGAYI*, *Clarke.*

Telôm Camp.

Distrib.—Penang, Perak and Borneo.

CONVOLVULACEÆ.

197. *LETTSOMIA PEGUENSIS*, *Clarke.*

At the 15th mile on the road to Jor from Tapah.

SOLANACEÆ.

198. *SOLANUM BLUMEI*, *Nees.*

Telôm Forest, on banks of streams, abundant in some spots. In most of the hill woods of the Peninsula; also in Java, Sumatra and Borneo.

199. *S. TORVUM*, *Sw.*

In Sakai clearings near Telôm Camp.

SCROPHULARINEÆ.

200. *BONNAYA VERONICÆFOLIA*, *Spreng.*

On stones in the river at Telôm.

201. *CURANGA AMARA*, *Juss.*

Damp spots near the river Telôm.

202. *TORENIA PEDUNCULARIS*, *Benth.*

On the track towards Jor.

203. *T. ATROPURPUREA*, *Ridl.*, var. *BICOLOR.*

A handsome variety, over 1 foot tall and stouter. The corolla tube deep violet, the limb creamy white. Capsule $\frac{1}{2}$ inch long. Leaves 2 inches long. Ulu Batang Padang on the track.

OROBRANCHACEÆ.

204. *CHRISTISONIA SCORTECHINII*, *Prain*.

This beautiful white flower with a broad yellow bar on the lip was abundant in the bamboo woods of Ulu Batang Padang, the flowers just appearing above the ground. It appeared to be parasitic on the bamboos.

APOCYNACEÆ.

205. *ALYXIA FORBESII*, *King and Gamble*.

On Telôm Ridge. The fruit is, however, larger than usual, quite $\frac{1}{2}$ inch long. A hill plant in Penang, Perak and Pahang; and found also in Java and Sumatra.

206. *A. SCORTECHINII*, *King and Gamble*.

In flower on Gunong Berumban and Telôm Ridge.

ASCLEPIADEÆ.

207. *DISCHIDIA COCCINEA*, *Griff*.

Gunong Berumban. Common on all hills at high elevation.

208. *D. TUBULIFLORA*, *King and Gamble*.

Telôm Ridge.

209. *D. HIRSUTA*, *Decne*.

Telôm. Common in the low country.

210. *D. MONTICOLA*, *King and Gamble*.

Gunong Berumban.

211. *PENTASACME CAUDATA*, *Wall*.

Rocks in the Batang Padang River.

LOGANIACEÆ.

212. *GÆRTNERA KOENIGII* var. *oxyphylla*.

On the higher ridges at Telôm and Gunong Berumban. This variety seems to me very distinct from the *G. Koenigii*, of Wight, as figured in the *Icones*, 1815, so much so that I should certainly be inclined to keep it specifically distinct. It is a small shrubby tree with white flowers. King in the "Materials" omits to notice that the corolla inside is thickly white silky.

213. *FAGEÆA OBLONGA*, *King and Gamble*.

A big terrestrial shrub in fruit. Banks of a stream, Telôm.

GESNERACEÆ.

214. *ÆSCHYNANTHUS PARVIFLORA*, *n. sp.*

A tufted epiphyte with slender branches, over 1 foot long.

Leaves opposite, fleshy, entire, narrow lanceolate, acuminate, 3 inches long, $\frac{1}{2}$ inch wide; petiole $\frac{1}{2}$ inch long. Flowers

solitary, on slender pedicels, $\frac{1}{8}$ inch long. Calyx tubes free to the base, very narrow, linear acuminate, glabrous, $\frac{1}{2}$ inch long. Corolla greenish yellow, barely $\frac{1}{2}$ inch long, tube narrow, cylindric, lobes oblong, rounded, margins ciliate minutely, stamens included, anthers subglobose; capsule narrow, linear, cylindric, acuminate, 4-5 inches long, seed with a tuft of hair at one end and a single hair at the other.

Telôm, near the camp, on trees overhanging the river. This plant is undoubtedly near *Æ. purpurascens* of Java, but is distinct in its smaller narrower entire leaves, and smaller flowers with the corolla hardly as long as the sepals, which are free to the base.

215. *ÆSCH. PERAKENSIS*, *Ridl.*

Common as an epiphyte, often on very high trees, round Telôm and Gunong Berumban.

216. *ÆSCH. LONGICALYX*, *Ridl.*

A splendid plant. Calyx and corolla of a brilliant red. The capsules are 8 inches long. Epiphytic on Gunong Berumban and also on Gunong Irau, whence Messrs. Kloss and Robinson brought it.

217. *DIDISSANDRA FILICINA*, *Ridl.*

Extremely abundant at Telôm and up Gunong Berumban, on banks and rocks. The flowers are of a beautiful violet blue, paler inside the tube and nearly white outside and, with its fern-like leaves, a very attractive plant.

218. *D. WRAYI*, *Ridl.*

Flowers white with longitudinal violet stripes in the tube.

Telôm, on rocks by the stream and at Gunong Irau. Much less common than the preceding and but few in flower.

219. *D. LONGISEPALA*, *n. sp.*

Six inches or more tall, with a hairy stem. Leaves petioled, distinctly elliptic, acute edges serrate, 5 inches long, 2 inches wide or smaller, above sprinkled with scattered hairs, beneath hairy on midrib and nerves; nerves 14 pairs, fairly conspicuous beneath and less so above; petiole hairy, 3 inches long. Pedicel of flower slender, hairy, 4 inches long. Sepals linear acuminate, the edges serrate with a hair on each serrative, $\frac{1}{2}$ inch long, $\frac{1}{10}$ inch wide. Corolla wide, 2 inches long, gradually dilated upwards, lobes rounded, violet, paler in the tube, stamens four, filaments slender.

Cameron's plateau on the track to Gunong Irau (Kloss). This is allied to *D. Wrayi*, *Ridl.*, but differs in the larger serrate hairy sepals and different colouring.

220. *DIDYMOCARPUS SULPHUREA*, *Ridl.*

On the top of Gunong Berumban, almost out of flower.

221. *D. VENUSTA*, *Ridl.*

This remarkable plant was abundant on the upper part of Gunong Bernumban at 6,000 feet, but the flowers were nearly all destroyed by some insect. Its tall woody stem and serrate leaves with prominent veins make it a very striking plant and quite unlike any other species. It occurs also at the Semangko Pass.

222. *D. HISPIDULA*, *Ridl.*

What appears to be a form of this, but was only in bud, was met with in the Telôm Woods. It is abundant on the Taiping Hills.

223. *D. (§ HETEROBOEA) LANCEOLATA*, *n. sp.*

Stem woody, covered with densely appressed hairs. Leaves lanceolate acuminate, decurrent to the base of the petiole, closely and finely dentate, dark green sprinkled with pale hairs above, beneath thickly hairy on the nerves; young leaves thickly pubescent all over. Peduncles slender, solitary or in pairs, pubescent. Bracts linear, acuminate, $\frac{1}{8}$ inch long, narrow, hairy, pubescent. Sepals lanceolate acute, densely silky hairy, $\frac{1}{4}$ inch long. Corolla glabrous, 1 inch long, tube dilate gradually upwards, white with yellow spot in the mouth. Stamens filaments, filiform, straight. Anthers glabrous. Style and ovary thickly glandular, pubescent. Capsule narrow, cylindric, over 1 inch long, pubescent. Cameron's plateau on the way to Gunong Irau. Messrs. Robinson and Kloss brought a single specimen of this plant, which is certainly allied to *D. fuscata*, *Ridl.*, but there is no white central bar on the leaf, the peduncles are larger, the sepals wider and the corolla shorter and differently coloured.

224. *D. CRINITA*, *Jack.*

Occurs plentifully from Tapah up to about the 12th mile, but there it seems to stop.

225. *D. ALBINUS*, *Ridl.*

The type of this species is a plant obtained on Gunong Batu Puteh by Wray, and differs from a plant most abundant on Telôm in its being much less hairy or, more correctly, in possessing much shorter hair. This may be a slightly different local form, or perhaps due to some accident in drying. The Telôm plant was 4 feet or more tall and often branched. The stem olive-fuscescent and thickly viscid-hairy. Leaves dark green above, paler beneath, with a purple midrib. The panicles were usually four in the upper axils; peduncles 4 inches long and dichotomously branched. The flowers are 1 inch long and pendulous. Sepals lanceolate purplish. Corolla tube $\frac{3}{4}$ inch long, the upper lobes oblong truncate, lower one longer, the two outer ones oblong,

median ovate, all white with two yellow bars on the disc, edged with violet dots. It is one of the tallest species of the genus and a most attractive and elegant plant. It grew everywhere in the Telôm Valley.

226. *D. ALBINELLUS*, *n. sp.*

Stems over 1 foot tall, but shorter than those of *D. albinus*, Ridl., pubescent hairy. Leaves equal or subequal, ovate or lanceolate, acuminate subobtusate, base connate, 3-4 inches long, 1-2 inches wide, above glabrous, except in young leaves where the midrib is hairy, below hairy on the nerves, midrib and on the edges. Petiole hairy, $\frac{1}{2}$ - $\frac{3}{4}$ inch long. Raceme a little longer than the leaves, 3-4 inches long, simple or with one or two short branches, glandular, hairy. Bracts linear, $\frac{1}{2}$ inch long. Calyx lobes linear, acuminate, glandular, hairy, $\frac{1}{2}$ inch long. Corolla $\frac{1}{2}$ inch long, the tube broad, the lobes rounded, white with violet stripes. Stamens included. Pistil pubescent. Fruit (unripe) elongate cylindrical, acuminate pubescent.

Gunong Berumban at 6,000 feet altitude. This differs from *D. albinus* in its smaller size in all parts and more simple inflorescence and in the colouring of the flowers.

227. *D.*, *sp.*

On the Telôm Ridge behind the camp. A species apparently allied to *D. albomarginata*, but no flowers could be found.

228. *PARABEA PUBIFLORA*, *n. sp.*

Stem brown, rough. Leaves lanceolate acuminate obtuse, base decurrent on the petiole in an undulate margin, margins serrate irregularly with blunt serrations, above glabrous, dark green, beneath reddish, paler, the nerves pubescent; nerves about 16 pairs, 4 inches long, $1\frac{1}{2}$ inch wide; petiole rugose, winged to the base; peduncles 3-4 inches long, slender, erect, two-flowered pubescent. Bracts broadly lanceolate, persistent, $\frac{1}{4}$ inch long, puberulous on the edges. Pedicels short pubescent. Calyx lobes free to the base, linear acuminate pubescent, $\frac{1}{2}$ inch long. Corolla pubescent outside and in white, tube short, $\frac{1}{2}$ inch long, limb widely rounded, as long as the tube; lobes obovate, stamens two short as long as the tube; anthers oblong, yellow, filaments pubescent. Style a little longer pubescent, stigma capitate.

Gunong Irau (Robinson and Kloss). Messrs. Robinson and Kloss brought a single specimen of this curious plant from their expedition to Gunong Irau. The foliage is somewhat like that of *Didymocarpus venustus*. The flowers are very broad at the mouth in proportion to the length of the tube and the shortened stamens with thick pubescent, filaments are those of the genus *Parabaea*. It is unusual to find the corolla hairy on both sides as it is in this plant.

229. *RHYNCHOGLOSSUM OBLIQUUM*, *Bl.*

Ulu Batang Padang at the Second Camp.

230. *MONOPHYLLÆA HORSFIELDI*, *R. Br.*

Ulu Batang Padang, abundant at one point on the track. I have never before seen this plant elsewhere except on limestone rocks.

231. *STAURANTHERA GRANDIFOLIA*, *Benth.*

Ulu Batang Padang towards the Pahang boundary.

232. *RHYNCHOTECUM PARVIFLORUM*, *Bl.*

Ulu Batang Padang.

233. *CYTANDROMGEA MEGAPHYLLA*, *Hemsl.*

A large-spreading bush, almost a small tree. On a Sakai clearing on Gunong Berumban lower slopes. Flowers white.

234. *CYTANDREA CUPULATA*, *Ridl.*

In the Batang Padang valley, absent from Telôm.

Very widely spread over the Peninsula.

235. *C. DISPAR*, *Dec.*

Ulu Batang Padang between Jor and Telôm.

236. *C. GRANDIFLORA*, *n. sp.*

A large stout plant about 3 feet tall, stem fuscous, glabrous, four angled below. Leaves oblanceolate, acuminate, decurrent on the petiole, glabrous, except when quite young, margins serrate, except on the lower quarter, deep green, purple on the back; nerves about eight pairs, prominent on both surfaces, midrib thick, 8-12 inches long, 3-4 inches across. Bracts cup shaped, $\frac{3}{4}$ inch long, truncate ciliate, on the margins with ovate points. Corolla tube short and stout, no longer than the bract, limb 2 inches across, upper lobe bilobed, with oblong lobes, lower three also oblong, all white, the mouth of the tube yellow outside, all white, silky. Stamens recurved included, ochre yellow. Style short, dilated upwards. Fruit cylindric conic with a short sharp point, 1 inch long, $\frac{1}{4}$ inch through, corky, tessellate, rugose, light brown.

Growing abundantly in masses by the stream near the Telôm Camp and elsewhere in damp spots; nearly out of flower. Remarkable for the very broad corolla and the short utricular bract.

ACANTHACEÆ.

237. *STAUROGYNE SETIGERA*, *Kunze.*

Telôm.

238. *S. ARCUATA*, *C. B. Clarke.*

Not rare at Telôm, but only one plant found in flower. The corolla dark brown, red on both lobes. It occurs also on the Taiping Hills.

239. *S. SUBGLABRA*, *Clarke*.

Telôm Woods, common. Clarke gives this as very similar to *S. arcuata* in all essential points, the differences lying in the glabrous sepals and lanceolate leaves, but in life no two species could be more dissimilar. This species is, for the genus, tall with a long-arching raceme of pure white flowers, the raceme often 8 inches long, very different from the short more compact racemes, with one or two red flowers open at a time, of *S. arcuata*. The racemes were solitary in all the Telôm plants, but in those of the Taiping Hills the plants is often branched and bears several spikes. It occurs at the top of the Taiping Hills and on Kedah Peak.

240. *STROBILANTHES HIRTISEPALUS*, *Clarke*.

A much-branched herb, about 2 feet tall, with white flowers. In damp muddy ground in the forest near Telôm Camp, abundant but local. The hairs in my herbarium specimens are rather black than rufous as described in this species.

241. *S. RUFO-PAUPER*, *Clarke*.

On Telôm Ridge and Gunong Berumban at from 5,000 to 6,000 feet elevation.

242. *S. RUFICAULIS*, *n. sp.*

Stems ascending from a creeping base, slender, simple or with one or two branches, roughly red hairy, the internodes 2-3 inches long or less, 8 inches to over 12 inches tall. Leaves herbaceous, opposite, subequal, elliptic-lanceolate acuminate, base cuneate, margins undulate crenate, 4 inches long, $1\frac{1}{2}$ inch wide, hairy on both sides, especially on the nerves, with scattered but abundant long yellowish hairs. Heads 1 inch long, few flowered with six or eight lanceolate obtuse bracts, projecting beyond the flowers densely red hairy at the base, apices less hairy, $\frac{1}{2}$ inch long, $\frac{1}{10}$ inch wide.

Corolla campanulate with a narrow tube at the base, limb dilated lobes broad rounded sparingly hairy, $\frac{1}{2}$ inch long and nearly as wide across the mouth, pale blue. Stamens four, anthers subglobose.

Gunong Berumban near the top.

I cannot fit this in with any of Clarke's species belonging to this section, nor have I seen it elsewhere.

243. *S. VULPINUS*, *n. sp.*

Stems 1 foot or more, branched or simple slender, densely covered with short curled dark brown hairs. Leaves equal, broadly lanceolate to rhomboid, acuminate or cuneate at the tip, narrowed at the base, above sprinkled with a few hairs or glabrescent beneath, nearly glabrous, except for a little rough pubescence on the nerves; nerves nine pairs, margins undulate or crenulate, 5 inches long, by 2 inches

wide; petiole $\frac{1}{2}$ inch long, shortly roughly hairy like the stem. Heads elongate, one or two together terminal on short or long 1 inch peduncles, 2 to nearly 3 inches long, $\frac{1}{2}$ inch through. Bracts linear or oblong-linear blunt, bases densely rufous hairy, upper ones about $\frac{1}{2}$ inch long. Sepals linear obtuse, $\frac{1}{3}$ inch long, with long red hairs. Corolla $\frac{1}{4}$ inch long, curved, dilated rather suddenly at the lobes, pubescent light, blue. Capsule dilated upwards from a narrow base, $\frac{1}{2}$ inch long. Seeds four.

Telôm and Ulu Batang Padang.

244. *S. ALBOSTRIATA*, *n. sp.*

A weak herb about 1 foot tall, erect, little branched with short brownish hair, soon glabrescent below. Leaves subequal or often unequal ovate or acuminate, base cuneate, margins crenulate; nerves five to seven pairs, above glabrous, dark green, with white bars along the veins, beneath dark red, with scurfy pubescent veins; petiole 1 inch long, scurfy, hairy. Heads three or four terminal, with one in each axil of the uppermost pair of leaves or only terminal peduncled. Peduncles hairy, $\frac{1}{2}$ to nearly $\frac{1}{2}$ inch long. Calyx, sepals linear, acuminate, hairy. Corolla blue, 1 inch long, tube at base narrow, then suddenly broadened and curved, lobes $\frac{1}{2}$ inch long, rounded; tube hairy, limb glabrous, stamens four.

Abundant at Telôm and conspicuous from its beautifully-marked foliage.

245. *S. SCABRIDUS*, *n. sp.*

Somewhat robust, stems closely shortly brown hairy, internodes 3 inches long. Leaves very unequal, lanceolate, acuminate, narrowed to the winged petiole, margins crenulate; nerves six pairs, prominent above, texture coriaceous-chartaceous, above glabrous scabrid, beneath smooth paler, midrib closely pubescent, hairy; largest leaves 6 inches long by 2 inches wide, smaller one about half as large. Capitulum terminal, sessile, globose, about 1 inch long. Bracts ovate to orbicular, elliptic, apex rounded, thickly dotted with raphides. Flowers white. Corolla over $1\frac{1}{2}$ inch long, tube narrow at the base, dilated upwards, 1 inch across, lobes rounded, glabrous; stamens four.

Gunong Berumban. I also obtained this plant at the Semangko Pass.

246. *S. (§ Nudatæ) PEDICELLATA*, *n. sp.*

Leaves ovate acuminate, base cuneate, margins serrate, glabrous, very unequal; nerves inconspicuous on both surfaces, six to seven pairs, boldly curved and meeting in intra-marginal

curves, black above when dry, pale beneath; largest leaf 5 inches long, 2 inches wide; smaller $1\frac{1}{2}$ inch long; petiole $\frac{1}{10}$ inch long. Inflorescence of three heads on slender peduncles, $2\frac{1}{2}$ inches long, with a pair of leaf-like bracts at the base. Flowers several in a head with oblong pubescent obtuse bracts $\frac{1}{2}$ inch long, and several oblong linear bracts at the base of the pedicels. Pedicels short and stout. Sepals linear, obtuse, pubescent and covered with raphides $\frac{1}{2}$ inch long, connate at the base. Corolla $1\frac{1}{2}$ inch long, white, tube shortly cylindric, then campanulate, lobes rounded, subequal, glabrous outside, with long white hairs on the nerves inside. Stamens four, didynamous, and filaments with long white hairs. Anthers ovoid, rounded, two celled, mucous.

Cameron's plateau on the track to Gunong Irau (Messrs. Robinson and Kloss). A single specimen of this plant was brought by Messrs. Robinson and Kloss. To a certain extent it resembles *S. penstemonoides*, Miq., but its pedicelled flowers make it very distinct from any of that group. From Miquel's description it might be *S. pedunculosa* except that the corolla is glabrous outside. This latter species is Javanese.

247. *FILETIA BRACTEOSA*, C. B. Clarke.

A large shrub, conspicuous from its white flowers, about 4 feet tall or more, with terminal spikes, 2 inches or so long. Bracts ovate, white. Calyx a little longer, white. Bracteoles two, lanceolate, white. Sepals five, lanceolate, free to the base. Corolla tube short and thick, no longer than the calyx; upper lobe of limb broadly ovate, obtuse, slightly retuse, white; lower lip oblong bifid side lobes, linear oblong, a little longer than the central elevated one, which is broad and light yellow, ending in a rounded white tip. The whole corolla is about 1 inch long, stamens four in two pairs, filaments white, anther cells one, a little above the other white tinted with fawn colour on the back, which, like the base of the stamens, is ciliate with white hairs. The capsule club shaped, subacute, $1\frac{1}{2}$ inch long, seeds flattened elliptic inæquilateral on very short retinacula.

Clarke's description, or rather diagnosis, is so short that this description taken from living plants may make the plant easier to recognise.

It is very common round Telôm. The original plant was collected in Perak by Scortechini, but no locality is recorded.

248. *F. RIDLEYI*, Clarke.

Gunong Berumban at 5,000 feet and upwards.

This resembles *F. bracteosa*, but is dwarfer with narrower leaves. It occurs on the drier parts of the upland ridges; also on the Semangko Pass.

249. *JUSTICIA VASCULOSA*, Wall.

Telóm. About 3 feet tall. Flowers pale yellow entirely.

250. *J. BRACTEATA*, n. sp.

A straggling herb, 2 or 3 feet tall, nearly glabrous with slender branches. Leaves opposite, equal, ovate to lanceolate, thin, acuminate or acute, base cuneate, somewhat unequal, midrib on the back pubescent with close hairs; nerves 6 pairs, $4\frac{1}{2}$ inches long, 1-2 inches wide; petiole pubescent, 1 inch long. Cyme nearly sessile, terminal, about 1 inch long. Bracts lanceolate, obtuse, green, $\frac{1}{4}$ inch long. Sepals lanceolate acuminate, obtuse, green, glabrous. Corolla less than $\frac{1}{2}$ inch long, glabrous, white; the upper lobe inside striped with purple; the lower lip with violet. Stamens two, filaments glabrous. Anther cells, one above the other, elliptic oblong brown, both with white appendages, those of the lower cell, twice as long as those of the other, as long or longer than the cell. Capsule glabrous, $\frac{1}{2}$ inch long, club shaped with a long point. Seeds four, flattened, round, pale brown, closely pustulate.

Telóm and Gunong Berumban.

The Berumban form is smaller in leaf and rather more rigid and the bracts appear to have been purple.

251. *LEDA SUBCORDATA*, C. B. Clarke.

A small, low-growing weedy plant, with pure white flowers, growing in the Batang Padang valley, among bamboos.

252. *L. OBOVATA*, C. B. Clarke.

About 2 feet tall, with a weak slender spike of small flowers. The calyx is brownish in colour with glandular hairs. The corolla glandular hairy on the back; the upper lip dull red with two yellow streaks, the tip inside bright yellow; the lower lip is yellow, streaked on the palate with six red stripes. Stamens two with very unequal red brown anther cells, the filaments yellow with a red streak on the inner face. This is common about Telóm and in the Batang Padang valley from Jor to Telóm in wet spots in the woods, especially by streams.

VERBENACEÆ.

253. *CALLICARPA LONGIFOLIA*, Lam.

In a Sakai clearing at Telóm. Common in the low country.

254. *CLERODENDRON*, sp.

A large shrub, almost a small tree with deltoid leaves entire and corymbs of flowers several inches across. The flowers were not seen, but the calyx is large with acute lobes, and red.

It is allied apparently to *C. fragrans* and *C. colebrookianum*, Walp.

On Cameron's plateau, in low swampy ground.

LABIATÆ.

255. *SCUTELLARIA DISCOLOR*, *Colebr.*

Abundant at Telôm Camp, by the river bank and in Sakai clearings in sandy spots.

Flowers blue.

Distrib.—India and Java.

256. *GOMPHOSTEMMA OBLONGUM*, *Wall.*

Dr. Prain gives this plant from the Andamans and suggests that it may perhaps occur in the Malay Peninsula. What (after careful comparison of description and drawings) appears to me undoubtedly this species is quite common in the Peninsula, far more so than *G. Scortechinii*. It has white flowers and a glabrous style and short teeth to the calyx tube. It was growing in close masses round Sakai clearings and in other parts of the Telôm Woods, but only a few plants in flower. I have also collected it in Johore on Bukit Soga near Batu Pabat (Ridley, 1130), Pahang at Kota Glanggi, Pulau Tawar (No. 2148), Tahan River and on the route to Semangko Pass (No. 8564).

257. *G. CURTISII*, *Prain.*

Telôm, near a Sakai clearing, and plentiful in a very wet swamp among *Impatiens oncidoides*.

258. *PARAPHLOMIS RUGOSA*, *Prain.*

Damp low-lying ground, Telôm.

APETALÆ.

AMARANTACEÆ.

259. *DEERINGIA CELOSIODES*, *Br.*

About the 15th mile from Tapah to Jor.

The form of this plant met with here is the inland one with small flowers and leaves. It is an extremely different-looking plant from the typical sea-shore species, but it seems to be generally considered by botanists as specifically identical.

260. *CYATHULA PROSTATA*, *Bl.*

In Sakai clearings at Telôm.

261. *ACHYRANTHES ASPERA*, *L.*

In cleared ground, Telôm.

POLYGONACEÆ.

262. *POLYGONUM CHINENSE*, *L.*

Scrambling over grass and bushes at Jor, Telôm and on the lower slopes of Gunong Berumban.

Flowers white or rose-pink.

Distrib.—India, Malay islands, China and Japan.

PIPERACEÆ.

263. *ZIPPELIA LAPPACEA*, *Benn.*
 Ulu Batang Padang in dense forests.
Distrib.—Java.
264. *PIPER MURICATUM*, *B. C.*
 Telôm.
265. *P. PORPHYROPHYLLUM*, *N. E. Br.*
 Batang Padang valley.
266. *P. PELTATUM*, *Willd.*
 Batang Padang valley.
- 266a. *P. MAGNIBACCUM*, *C. De C.*
 Telôm on rotten logs.
- 266b. *P. TRIANDEUM*, *C. De C.*
 Telôm.
- 266c. *P. RIDLEYI*, *C. De C.*
 Telôm.
- 266d. *P. PENANGENSE*, *C. De C.*
 Telôm.

Three more Peppers were found, which I have been unable to identify. The most striking plant was an erect herbaceous plant with a zigzag stem, usually unbranched and very oblique lanceolate leaves, the spikes short and in fruit large coiled in a circle with orange yellow fruits, nearly as big as those of black pepper. It might be the plant intended by Blume under the name of *Piper arcuatum*, but that appears to be a climbing plant.

CHLORANTHACEÆ.

267. *CHLORANTHUS BRACHYSTACHYUS*, *Bl.*
 Forests at Telôm. Common in hill forests.

LAURINEÆ.

This order has not yet been worked up for the "Materials for a Flora of the Malay Peninsula," and the whole collection of *Laurineæ*, belonging to the Herbarium in Singapore, has been sent to Mr. Gamble, who is at work on them, so that it is impossible to fully work up the species collected. There were, however, obtained, the following plants:

268. *ACTINODAPHNE SESQUIPEDALE*, *Hook. fil.*
 A small-sized tree in flower at Telôm.
269. *ENDIANDEA*, *sp.*
 In fruit. A big tree, with large coriaceous leaves and elliptic fruit, slightly narrowed towards the base, 8 inches long. Calyx not enlarged in fruit.
 Telôm Camp.

270. *ALSEODAPHNE* (?)

Shrub, with narrow grey leaves.
Gunong Berumban.

271. *LITSEA MYRISTICÆFOLIA*, *Wall.*

A small-leaved form. Telôm Ridge.
And three other *Litseas*.

NEPENTHACEÆ.

NEPENTHES were remarkably scarce all through this region, though four species occurred.

272. *NEPENTHES MACFARLANEI*, *Hook. fil.*

On Gunong Berumban. This plant has apparently only been recorded from Gunong Bubu, where all collectors have obtained it. It occurs also on the hills above the Semangko Pass.

273. *N. SANGUINEA*, *Lindl.*

Telôm.

274. *N. GRACILLIMA*, *Ridl.*

Telôm, also occurs on Gunong Tahan.

275. *N. RAMISPINA*, *n. sp.*

Stem climbing nearly terete, pubescent above, woody. Leaves elliptic lanceolate amplexicaul not decurrent, ending in a cirrhous, coriaceous, glabrous, except for the midrib on both sides, which is pubescent; nerves invisible; 3-4 inches long, $\frac{1}{2}$ - $\frac{3}{4}$ inch wide; cirrhous 2-8 inches long, pubescent. Pitchers (ascidia) cylindric, narrowed at the base and bent. 6-8 inches long, 1 inch through, pubescent outside, wings low keel like, usually bearing bristles, $\frac{1}{2}$ inch long or less, sometimes nude. Peristome very narrow with close set ridges, running up to the narrow neck. Lid (operculum) orbicular, cordate, $1\frac{1}{2}$ inch across, a little wider than long, glabrous, glands circular scattered, not very conspicuous. Spur of three or four bifurcate processes pubescent, $\frac{1}{2}$ inch long. Raceme slender, unbranched, 6 inches long, rachis pubescent. Bracts linear subulate, $\frac{1}{10}$ inch, rufous hairy. Flowers solitary on slender pubescent pedicels $\frac{3}{10}$ inch long. Sepals four, obovate obtuse, $\frac{1}{10}$ inch long, back pubescent, edged with rufous hairs, thickly covered with elliptic glands above. Staninal column about as long, red pubescent. Anthers 12, glabrous. Female raceme shorter. Capsule $\frac{1}{2}$ inch long, fusiform, truncate, pubescent. Telôm Ridge, also on the top of the Semangko Hills, Selangor (No. 12064 of my collection). Remarkable for the branched spines on the back of the neck between the operculum and cup like those of *N. tentaculata*.

BALANOPHORACEÆ.

These curious plants were more abundant here than I have ever previously seen in the Peninsula, not only in numbers of specimens but in species.

276. *BALANOPHORA GIGANTEA*, Wall.

Not common. A plant in the Telôm Valley and one in the Batang Padang valleys. The tuberous rhizome, about 6 inches through, was dark orange colour. Bracts ovate subcoriaceous, dark red. The spike of male flowers 3 inches long. Flowers scattered on short white stalks. The petals four, reflexed oblong obtuse, whitish with dark red tips. Anthers numerous on a white column.

277. *B. FORBESII*, Fawc.

The commonest species, abundant all through the Telôm Forests and into Ulu Batang Padang. Bright red.

278. *B. MULTIBRACHIATA*, Fawc.

Less common. Telôm Forests and brought by Messrs. Robinson and Kloss from the further woods towards Gunong Irau.

The brilliant scarlet branches of the rhizome of this handsome species resemble a scarlet coral.

279. *B. POLYANDRA*, Griff.

Tuber rather large, about as big as the fist, deeply buried, and branching stems, only males seen, 4-8 inches tall, cylindric, slender, dirty yellowish with white anthers.

This appears to be parasitic on a large woody liane.

It is not rare in the Telôm Woods.

PROTEACEÆ.

280. *HELICIA*, sp.

At Telôm, in fruit. This is a common species in the Malay Peninsula, but is not to be found in the "Flora of British India." It resembles *H. petiolata*, but has entire and much thinner leaves with longer petioles.

THYMELEACEÆ.

281. *DAPHNE INVOLUCRATA*, Wall.

A shrub, with long-stalked white flowers, very pretty.

Ulu Batang Padang.

Distrib.—Himalayas.

282. *WIKSTÆMIA CANDOLLEANA*, Meissn., "*Chandan*."

On Gunong Berumban. A form with narrow lanceolate acute leaves on Bukit S'tempat, one of the lower ridges of the same mountain.

LORANTHACEÆ.

283. *LORANTHUS FORMOSUS*, *Bl.*

Telôm; only fallen flowers could be obtained, as it grew on very lofty trees.

284. *L. FERRUGINEUS*, *Roxb.* (?)

In fruit. The foliage exactly resembling that of *L. ferrugineus*. The fruit elliptic in outline, ferruginous, tomentose, $\frac{1}{2}$ inch long. On trees over the river, Telôm.

EUPHORBIACEÆ.

285. *PHYLANTHUS MUSCOSUS*, *n. sp.*

Large shrub, branches slender brown; young parts red scurfy. Leaves alternate, chartaceous elliptic, subacute to acuminate, base rounded, inæquilateral, glabrous, except the midrib on the back, which is scurfy, 2-3 inches long, 1 inch wide; nerves inconspicuous above, about six pairs, ascending directly; petiole scurfy, $\frac{1}{16}$ inch long. Male flowers borne on axillary panicles, $\frac{1}{4}$ inch long or less, of three to five short branches covered with persistent rusty-brown bracts ovate. Pedicel slender, $\frac{1}{16}$ inch long. Perianth lobes four, obtriangular, lacerate red disc of four hemispheric lobes. Stamens two, anthers reniform sessile. Female flowers in upper axils solitary or two together. Bracts linear. Fruit tricocous, capsule on a long slender peduncle, 2 inches long, dark brown covered all over with short papillæ, $\frac{1}{2}$ inch long. Seeds reniform with a convex back and sharp inner angle dark red brown shining, $\frac{1}{4}$ inch long, finely transversely lined.

Gunong Berumban. This is allied to *Ph. gomphocarpus*, but differs in the bracteate panicle of the male flowers, which resembles tufts of brown dry moss.

286. *BREYNIA ANGUSTIFOLIA*, *Hook. fil.*

A small tree. Fruit red with a very large showy calyx. Ulu Batang Padang.

287. *BACCAUREA MOTLEYANA*, *Hook. fil.*

A tree in the Telôm Forests, only seems to differ from the well-known cultivated "Rambai" in its leaves, being narrowed at the base, and the male flowers borne on shorter pedicels. I have never seen the "Rambai" tree wild anywhere else.

288. *B.*, *sp.*

Telôm. In fruit. This much resembles *B. latifolia*, but the leaves, which dry black, are glabrous and shining on both sides and nearly sessile. The fruit spikes are nearly 1 foot long.

289. *CLAOXYLON LONGIFOLIUM*, *Muell.*

On Gunong Berumban.

290. *ALCHORNEA DISCOLOR*, *Hook. fil.*

Telôm on the further side of the river. Small tree with red leaves.

291. *HOMALANTHUS POPULIFOLIUS*, *Gray.*

Common round Telôm Camp

292. *MACARANGIA TRILOBA*, *Muell.*

Telôm. This common low country tree ascends to about 4,000 feet altitude. Its bark was much in request for tying loads.

293. *MALLOTUS MACROSTACHYUS*, *Muell.*

Telôm near the river

URTICACEÆ.

294. *FIGUS POMIFERA*, *Wall.*

In damp low-lying ground by the Telôm River.
Figs very large dull green blotched

295. *F. ROSTRATA*, *Lam.*

In forests, Telôm. Figs orange

296. *F. LEPICARPA*, *Bl.*

In forest at Telôm.

297. *F. CHARTACLA* var. *TORULOSA.*

On Gunong Berumban

298. *F. INDICA* var. *GELDERI.*

On Gunong Berumban

299. *F. HIRTA*, *Vahl.*

Common round the camps, Telôm.

300. *F. ALBA*, *Reinw.*

Common by the camp at Telôm.

Leaves much larger than usual and upper part of stem hairy.

301. *F. PYRIFORMIS*, *Hook. fil.*

A little shrublet on rocks at a cascade at the 13th mile from
Tupah on the Jor route, growing well in the splash of the
water. Figs purple.

302. *F. VARIOLOSA*, *Lindl.*

A bush with purplish figs. Common on Gunong Berumban.

303. *F. DIVERSIFOLIA*, *Bl.*

On Gunong Berumban.

304. *HULLETTIA DUMOSA*, *King.*

A tree of some size with large, deep green, coriaceous, shining
leaves. The inflorescence is a decurved fleshy circular disc on

an obconic base, yellowish green, from which project 16 or more four-celled anthers. The disc is about $\frac{1}{2}$ inch across and very fragrant.

Telôm in dense forest.

305. *PELLIONIA JAVANICA*, *Bl.*

Telôm in low damp places by the river.

306. *ELATOSTEMMA MACROPHYLLUM*, *Brugu.*

Telôm.

307. *E. LINEOLATUM*, *Wt.*

Damp spots, Telôm.

308. *E. SESSILE*, *Forst.*

Rocks in the streams, Telôm.

309. *E. ACUMINATUM*, *Brugu.*

Telôm.

310. *PROCRIS FRUTESCENS*, *Bl.*

Not rare, Telôm.

311. *POUZOLZIA BENNETTIANA*, *Wt.*

In grassy places near the camp at Telôm. New to the Peninsula.

312. *P. VININEA*, *Wedd.*

Forests, Telôm.

313. *BOEHMERIA SIDÆFOLIA*, *Wedd.*

Telôm.

Distrib.—India and Java.

CUPULIFERÆ.

314. *QUERCUS PULCHRA*, *King.*

A tree overhanging the Telôm River. Only recorded from Borneo, Sarawak, but the plant seems identical with the plant figured by King.

315. *Q. OMALKOS*, *Korth.*

Fruits gnawed by squirrels were picked up in Telôm.

316. *CASTANOPSIS ARGENTEA*, *A. D. C.*

On the first ridge between Ulu Batang Padang and Telôm and at Telôm Camp. Quite a small tree for a *Castanopsis*. New record for the Peninsula. As it has been met with previously in Tenasserim and Burmah, and also in the Malay islands, Dr. King in the "Annals of the Calcutta Botanic Gardens" expressed an opinion that it would also be found on the central range of the Peninsula, which prophecy has thus been found correct.

GNETACEÆ.

317. *GNETUM BRUNONIANUM*, *Griff.*

A small shrub. Common on many hills of the Peninsula. On a dry ridge leading from Telôm to the Batang Padang valley.

318. *G. LATIFOLIUM*, *Bl.*

A big climber in flower and fruit on a large tree at Telôm Camp. not previously recorded from the Peninsula.

CONIFERÆ.

319. *PODOCARPUS CUPRESSINA*, *Br.*

Forests in Telôm Valley. Some large-sized trees and many seedlings seen.

320. *DACRYDIUM ELATUM*, *Wall.*

Some very big trees on the Telôm Ridge.

MONOCOTYLEDONS.

ORCHIDEÆ.

Although there were very many orchids growing about Telôm, by far the greater number were out of flower, so that this list does not give any idea of what might be obtained earlier in the year.

321. *OBERONIA PORPHYROCHILA*, *Ridl.*

Apparently this species, originally obtained from Bujang Malacca, but it was in fruit only here.

322. *O. FLAVA*, *n. sp.*

Stem short, 1 inch long, flexuous. Leaves narrow, linear, falcate acuminate, 2 inches long, $\frac{1}{10}$ inch thick; scape slender, 6 inches long, quite glabrous, the lower third nude except for a few linear acuminate bracts, spike rather dense, flowers minute yellow. Bracts narrowly lanceolate, acuminate, entire, as long as the ovary sepals ovate entire, obtuse, reflexed, shorter than the ovary. Petals narrower lanceolate entire, lips three lobed, lateral lobes short broad ovate blunt, middle much longer oblong, ending in two short acute straight slightly divaricate lobes.

Telôm Forests.

Allied to *O. gracilis*, Hook. fil., and *O. caudata*, King, but with longer more distinct lobes to the lip than the first, but not caudate acuminate like the second.

323. *LIPARIS ELEGANS*, *Lindl.*

Common on dry banks, Telôm.

324. *L. COMOSA*, *Ridl.*

Common on trees at Telôm. Previously only known from the Taiping Hills.

325. L. (§ MOLLIFOLIÆ), *sp.*

Common in damp spots at Telôm, but only in fruit.

326. MICROSTYLIS ACUTANGULA, *Hook. fil.*

In fruit, Telôm.

327. PLATYCLINIS LINEARIFOLIA, *Ridl.*

Gunong Berumban on the top 6,500 feet. Occurs on Mt. Ophir and several of the Perak Hills at high altitudes. Flowers pale green, the keels on the lip brown.

328. DENDROBIUM LONGIPES, *Hook. fil.*

On the top of Gunong Berumban in flower. Sepals and petals white rose tinted. Lip white, lobes streaked brown, tips yellow, midlobe with an orange yellow blotch and white tip, column white.

329. D. (§ PEDILONUM) CLARISSIMUM, *n. sp.*

Stems about 1 foot long or more, flexuous, $\frac{1}{4}$ inch through, slightly flattened. Leaves thin, lanceolate, acute, 2-4 inches long, $\frac{1}{2}$ inch through, base rounded, oblique. Raceme subterminal, of about four or five flowers on a rachis, 2 inches long. Bracts very small, ovate, acute. Pedicels slender, $1\frac{1}{2}$ inch long. Flowers 1 inch across, white. Sepals ovate, acute, broad. Petals obovate, obtuse, larger, with a rounded tip slightly tinted with pink. Mentum 1 inch long, cylindric, then dilated, ending in a short point. Lip base linear, blade quadrate, finely fimbriate on the margin entire. Stelidia of the column short rounded obscure orange, anther ovate, blunt.

Telôm. A single plant in flower near the cascade and one or two more seen nearer the camp.

A very pretty species near *D. hymenopterum*, *Hook. fil.*, with broader leaves and a different mentum and lip.

330. BULBOPHYLLUM (§ SESTOCHILUS) POLYSTICTUM, *n. sp.*

A long-creeping rhizome, rather stout pseudobulbs distant, cylindric, 3 inches long. Leaves coriaceous elliptic oblong, petiolate obtuse at the tip and gradually narrowed to the petiole, 8-12 inches long, $2\frac{1}{2}$ inches wide. Scape one flowered, 4-6 inches long, with three or four oblong cuspidate sheaths at the base. Flower large. Upper sepal, 3 inches long, $\frac{1}{2}$ inch wide at the base, lanceolate acuminate, the back yellow, thickly spotted with red, passing into dull maroon red on the edges, in front pale ochreous yellow, lower sepals three-fourths the length of the upper one, lanceolate acuminate, 1 inch wide at the base, connate with the column foot, outside greenish, spotted with blackish red at the tip, the base tinted with red, inner face reddish punctate black petals. Lip

ovate, cordate with a deep notch at the base and rounded lobes open, acuminate, fleshy, curved, sides elevated, upper surface pinkish with an orange spot in the notch, under surface pinkish, thickly spotted with black purple at the tip. Column foot long, curved, yellow with red spots, stelia obscure, hardly distinguishable. orange. Anther orange.

Telôm on the track to Gunong Berumban, climbing up a tree trunk. A handsome species, perhaps as near *B. Lobbi*, Lindl., as any, but with very different distant pseudobulbs.

331. *B. (§ MONANTHA PARVA) TINEA*, *n. sp.*

Rhizome very slender, filiform, pseudobulbs oblong, prostrate, with the tip ascending, distant, $\frac{1}{4}$ inch long and as far apart. Leaves narrow, oblanceolate, spatulate, dilating from the base upwards, obtuse, 1 inch long, $\frac{1}{8}$ inch wide. Scape filiform, 3 inches long, with a small lanceolate, appressed bract. Flower solitary, $\frac{1}{2}$ inch across, upper sepal lanceolate, acute, $\frac{1}{2}$ inch long, lower ones semi-ovate, obtuse, broader, all yellow orange streaked with darker orange. Petals very small, linear, oblong, yellowish with a pale green midrib. Lip fleshy, blunt, longer than the petals straight, oblong, pustular, dull reddish purple. Stelia long, subulate, longer than the column.

On trees on Gunong Berumban at 6,000 feet altitude.

This is allied to *B. catenarium*, Ridl., differing in its larger leaves and pseudobulbs and broad-rounded sepals, which suggest the appearance of a small orange-coloured moth, whence the specific name.

332. *BULBOPHYLLUM (§ HIRTULA) TRICHOGLOTTIS*, *n. sp.*

Rhizome short with crowded pseudobulbs, $\frac{1}{2}$ inch long, cylindric, covered with fibrils. Leaf elliptic, narrowed to the base, apex obtuse, coriaceous, 6 inches long, $2\frac{1}{2}$ inches wide, hardly petioled; scape very slender, $2\frac{1}{2}$ inches long, pale green, with one or two lanceolate, acute, sheathing leaves. Flowers six, crowded at the tip subcapitate, small. Bracts ovate, acute, very small, green. Pedicel and ovary, $\frac{1}{10}$ inch long, pink. Sepals equal and subsimilar lanceolate, acute, upper one gibbous on the back, $\frac{1}{2}$ inch long, margins of upper one ciliate, yellowish reticulated with dark maroon purple, lower ones more ovate connate at base. Petals rather more than half as long, linear oblong subacute yellowish edges and lined with maroon purple, margins long ciliate, lip shorter than the sepals fleshy flattened, tongue-shaped obtuse, thick, pustular base of limb retuse with two acute points deep crimson, paler in the centre edge, ciliate, claw thick channelled, pale greenish yellow. Column stout, stelia green, of

two broad short acute lobes. Anther flat broad oblong, margin ciliate. Telôm, brought home alive and flowered in the Botanic Gardens, February, 1909.

This species belongs to the group of *Hirtula* and resembles *B. hirtulum*, Ridl., and *B. limbatum*, Lindl., in many points. The flowers indeed are very like those of *B. hirtulum*, but it differs from both of these in its much larger leaves, and the flowers crowded together into a head. The size of the inflorescence is absurdly small for the size of the foliage.

333. *B. CONIFERUM*, *n. sp.*

Rhizome short and thick, pseudobulbs $\frac{1}{3}$ inch long, crowded together cylindric, covered with fibrils. Leaves very coriaceous, thick, spatulate narrowed to a channelled petiole, rounded at the tip, 6 inches long, and $1\frac{1}{4}$ - $1\frac{1}{2}$ inch in the widest part, light-shining green. Scape purple, 6 inches long, $\frac{1}{8}$ inch thick, with one or two lanceolate acuminate sheathing bracts, $\frac{1}{4}$ inch long. Flowers very densely set in a cone-shaped spike, very small. Bracts ovate acute, much longer than the ovary, cuspidate purple. Ovary extremely small, sunk in the thickened rachis. Upper sepal lanceolate green striped and tipped with fuscous purple, $\frac{1}{10}$ inch long, lower pair connate into an oval organ obtuse, as long, green edged with purple, all minutely puberulous. Petals linear lanceolate, green, pubescent, half as long as the sepals. Lip shorter, ovate, flat fleshy base, truncate retuse, apex rounded, light green. Column very small, stelidia ovate, obtuse, entire; anther broad transversely oblong, rounded, grooved between the cells, margin truncate emarginate, nearly as large as the lip and quite as broad and bigger than the column.

Telôm, on trees. Flowered in the Botanic Gardens, February, 1909. This species approaches *B. triste*, Rehb. fil., and *B. gracilipes*, King and Pantling, but is quite different in foliage from either, and the flowers are smaller and form a dense head.

334. *B. GIGAS*, *Ridl.*

In fruit. Telôm. Occurs also on the Taiping Hills.

335. *B. CAPITATUM*, *Lindl.*

Gunong Berumban. Usually found at most high altitudes in the Peninsula.

336. *B. (§ RACEMOSA) ARACHNITES*, *n. sp.*

Rhizome woody. Pseudobulbs close, very small cylindric truncate, $\frac{1}{8}$ inch long. Leaf coriaceous lanceolate acuminate acute, gradually narrowed to the petiole, 6 inches long, 1 inch wide; petiole 2 inches long. Raceme, 8 inches long, erect. Flowers about 12. Bracts small, ovate, pure white like the ovary.

Sepals ovate, lanceolate filiform caudate, base rounded gibbous, white nearly 2 inches long, the tail being $1\frac{1}{2}$ inch long. Petals oblong truncate orange, shorter than the broad part of the sepals. Lip oblong, obtuse, flat, rather thin yellow. Stelidia of column erect, short setiform.

Telôm on a fallen tree by the first stream to the East.

The finest species of this group I have seen, the white sepals with their long thread-like tails give it a very pretty appearance.

337. *ERIA BIDENS*, *Ridley*.

On trees on Telôm Ridge. Fruit only.

338. *E. LONGIFOLIA*, *Hook. fl.*

Gunong Berumban and other high ridges near Telôm.

339. *E. MAJOR*, *Ridl.*

On Gunong Berumban.

340. *E. TENUIFLORA*, *Ridl.*

On trees at Telôm.

341. *E. FEROX*, *Bl.*

Gunong Irau.

342. *E. TERETIFOLIA*, *Griff.*

Common on Telôm Ridge, Gunong Berumban, etc. Occurs on all our higher hills.

343. *E. (§ BRACTESCENTES) CARNEA*, *n. sp.*

Stems tufted cylindric, 8 inches tall, $\frac{1}{4}$ inch through, with long wiry roots. Leaves elliptic lanceolate acuminate acute, narrowed to the base, 10 nerved, subpetioled, 6 inches long, 1 inch wide. Racemes two in the uppermost axils lax, about 12 flowered, slender, 3 inches long, subtended at the base by a lanceolate acuminate papery bract, $1\frac{1}{2}$ inch long. Bracts persistent oblong lanceolate, thin, pale, $\frac{1}{3}$ inch long. Pedicel $\frac{1}{2}$ inch long, slender, pubescent. Upper sepal narrow lanceolate linear acute curved, $\frac{1}{8}$ inch long, laterals broad at the base, falcate acuminate, mentum scrotiform rounded. Petals narrower than the upper sepal, linear curved. Lip three lobed, lateral lobes broad, ovate, falcate, large, minutely papillose, midlobe ovate orbicular acute with a very short narrow base, prominently marked with radiating veins, two short-raised ridges run on the base of the side lobes, thickest at the termination, and three lower undulate ones run along the disc to the midlobe. Column short and broad as long as its foot. Anther oblong.

Telôm, on trees overhanging the river. The flowers are small, dull flesh colour with some yellow on the lip. It is allied to *E. recurvata*, *Hook. fl.*

344. *PHREATIA CRASSIFOLIA*, *n. sp.*

Stems very short, $\frac{1}{2}$ inch long, six-leaved. Leaves fleshy, linear curved, $1\frac{1}{2}$ inch long, $\frac{1}{10}$ inch across. Spikes longer from the upper axils, $1\frac{1}{2}$ inch long, base with one or two lanceolate acuminate sheaths, the biggest $\frac{1}{8}$ inch long, flowers densely crowded, numerous, white. Bracts pale lanceolate acuminate, longer than the flowers. Ovary short, thick papillose shortly stalked. Sepals ovate obtuse, mentum short scrotiform. Petals lanceolate obtuse, nearly as broad as the sepals. Lip ovate subacute, cordate on the free narrow column foot. Column very short, margins of clinandrium elevated. Anther broad, distinctly two celled.

Near Telôm (Mr. H. C. Robinson) also on Taiping Hills.

This small species differs noticeably in the close-set fleshy subterete curved leaves, much shorter and compacter than those of *P. minutiflora*, Lindl., of which I previously considered it a form. There is, however, besides this, a difference in the flowers: the lip, instead of being absolutely adnate by its base to the column base, is borne on a short foot, and is more widely ovate at the base.

345. *AGROSTOPHYLLUM MAJUS*, *Hook. fl.*

On trees, Telôm Woods, a large form.

346. *CERATOSTYLIS GRACILIS*, *Bl.*

Telôm Woods.

347. *COLLABIUM NEBULOSUM*, *Bl.*

Sporadic in damp woods at Telôm. In flower, by the cascade.

348. *NEPHELAPHYLLUM PULCHRUM*, *Bl.*

Telôm.

349. *N. TENUIFLORUM*, *Bl.*

On Gunong Berumban. Petals and sepals olive green, lip white with violet edge and streaks in centre.

350. *SPATHOGLOTTIS AUREA*, *Lindl.*

Telôm.

351. *CALANTHE VERATRIFOLIA*, *R. Br.*

One of the various forms with a lax raceme.

Woods towards Cameron's plateau, below Gunong Berumban, just coming into flower.

352. *C. OVATA*, *n. sp.*

Leaves several, obovate to lanceolate cuspidate, narrowed to the base, plicate, five ribbed, glabrous, 8 inches long, 3 inches wide; petiole 6 inches long. Scape 30 inches tall with numerous flowers, slender, raceme 4 inches long. Bracts ovate, shortly cuspidate, pubescent, persistent, $\frac{1}{4}$ inch long; lowest

ones lanceolate, acuminate, cuspidate. Flowers about 25, smaller than those of *C. veratrifolia*, on slender pedicels, $\frac{1}{2}$ inch long. Sepals and petals white, ovate, cuspidate. Petals narrower, subspathulate, $\frac{1}{2}$ inch long. Lip short, a little longer than the sepals, four lobed; lateral lobes erect, oblong, rounded, midlobe obovate, bilobed; lobes short, broad, rounded edges, fimbriate. Callus horse-shoe shaped, yellow. Column violet. Fruit elliptic, 1 inch long; spur filiform, $\frac{1}{2}$ inch long.

Telôm, banks of the stream near the camp.

Allied to *C. veratrifolia*, but with more distinctly-petioled leaves, smaller flowers and shorter, broader lip.

353. *C. ANGUSTIFOLIA*, Lindl.

Plentiful on Gunong Berumban. Flowers pure white, except the two horn-like calli and base of the obovate midlobe yellow. The spur as long as the short ovary and pedicel.

354. *C. ANGUSTIFOLIA* var. *FLAVA*.

With the pure white form of *C. angustifolia*, Lindl., on Gunong Berumban was found a plant, which differed conspicuously in its flowers being of an ochre yellow. The leaves are somewhat broader, but not as broad as in *C. albolutea*, Ridl., and the petals and sepals are short and blunter as in *C. angustifolia*, the lip is rather more deeply cleft. Possibly it is a natural hybrid.

355. *C. ALBOLUTEA*, Ridl.

Gunong Berumban.

356. *C. MONOPHYLLA*, n. sp.

Leaf solitary, ovate, acute, slightly narrowed at the base, five nerved, 6-7 inches long, 3 inches wide, glabrous; petiole slender, 3-6 inches long. Scape lateral erect, 7-9 inches long; glabrous, bearing four or five nodding flowers at the top. Bracts lanceolate acuminate, $\frac{1}{2}$ inch long. Ovary and pedicel nearly 1 inch long, sepals and petals ovate, cuspidate, $\frac{1}{2}$ inch long, rose-pink. Lip trilobed, lateral lobes short, oblong, acute, midlobe narrow, spathulate bilobed with rounded lobes, spur very short and straight, not dilate at the tip. Fruit elliptic, narrowed at the base, 1 inch long, pendent.

Telôm by the track near the camp. Only two plants seen.

It has the general appearance of a *Geodorum* in its small pink, never expanded flowers, and is apparently self-fertilized.

357. *DILOCIA CANTLEYI*, Ridl.

Summit of Gunong Berumban. In fruit. It also occurs on Gunong Bubu and Gunong Inas.

358. *ARUNDINA SPECIOSA*, *Bl.*

Said to be common in this district. I did not find it, but Messrs. Robinson and Kloss found it between Telôm and Kuala Lipis.

359. *CÆLOGYNE SPECIOSA*, *Lindl.*

On trees near Cameron's plateau and Gunong Irau. In flower.

360. *C. PERAKENSIS*, *Hook. fil.*, *C. SULPHUREA*, *Ridl.*, *Materials*, 1., p. 132, not *Rchb. fil.*

Gunong Irau (Messrs. Robinson and Kloss).

Doubtless Hooker is right in separating the Malay Peninsula plant from the Javanese *C. sulphurea*.

361. *C. CARNEA*, *Hook. fil.*

Gunong Irau.

Several other *Cælogyne*s were seen, but not in flower. One appeared to be *C. asperata*, *Lindl.*

362. *PHOLIDOTA PARVIFLOEA*, *Hook. fil.*

On a fallen tree at Telôm.

363. *EULOPHIA MACRORRHIZA*, *Bl.*

On the track to Jor, Ulu Batang Padang. This curious leafless and apparently saprophytic species is almost entirely of a dull reddish colour. The flowers dull red, the tip pink with a whitish bar in the centre, and a purple base, the spur white. It appears to be exactly Blume's plant.

364. *DIPODIUM PICTUM*, *Rchb. fil.*

On trees between the Sakai clearings and the river and elsewhere at Telôm in full flower. A very light-coloured form with few and small white spots. This plant seems equally at home in the damp forests of the plains and on the dry mountain ridges. I have found it in the Semangko Pass at a height of 4,000 feet, as well as in the low forests of Singapore.

365. *GRAMMATOPHYLLUM SPECIOSUM*, *Bl.*

A small plant seen on a fallen log across the river at Telôm.

366. *RENANTHERA MATUTINA*, *Lindl.*

On trees overhanging the Telôm River. Common, but only a few in flower.

367. *SACCOLABIUM MINUTIFLORUM*, *n. sp.*

Stem, 3-4 inches long. Leaves linear, fleshy, curved, $2\frac{1}{2}$ inches long, $\frac{1}{10}$ inch wide; sheaths, $\frac{1}{8}$ inch long, ribbed. Inflorescence paniced, very slender, 6 inches long; peduncle 3 inches long; branches four, very slender, 3 inches long, floriferous nearly to

the base. Bracts persistent lanceolate, acuminate, $\frac{1}{50}$ inch long. Flowers numerous, minute, white. Upper sepal lanceolate, laterals broader, ovate, cuspidate, keeled. Petals as long, linear oblong, truncate narrower. Lip, lateral lobes indistinct, rounded, hemispheric, erect, midlobe fleshy, base narrow, apex dilated, elliptic, ovate, obtuse in the centre, a rounded callus, beneath a larger conic thickening, spur elliptic, thick, obtuse, shorter than the ovary, as long as the lip, pendent not partitioned. Column short; anther hemispheric, grooved above, beak triangular up-curved. Pollinia pedicel linear, disc triangular.

Telôm, on a fallen tree by the track.

Allied to *S. perpusillum*, Hook. fil., but differing in its branched inflorescence, glabrous flowers and the curious form of the lip.

368. *THRIXSPERMUM*, *sp.*, near *LILACINUM*, *Rehb. fil.*

This plant, which was abundant on dry banks at Telôm, bore no trace of flowers. I have also met with it on the Taiping Hills, near the top, but equally flowerless. It has the habit of *T. lilacinum*, Rehb. fil., but is much more slender and weaker with smaller leaves.

369. *SARCOCHILUS ACUMINATUS*, *n. sp.*

Stem $\frac{1}{2}$ -2 inches long. Leaves few, elliptic, narrow inæquilateral at base, apex obtuse, 3-4 $\frac{1}{2}$ inches long, $\frac{3}{4}$ -1 inch wide. Raceme rather stout, 3 inches long, hardly thickened above the pedicel. Bracts persistent, small, ovate, acute. Sepals and petals long lanceolate, acuminate, 1 inch long, yellow. Lip three lobed, side lobes skin, midlobe short, straight, white spotted with purple on the base. Spur long. Column yellow.

Telôm, on a tree by the river. Remarkable for its long narrow petals and sepals.

370. *PODOCHILUS SCIUREOIDES*, *Rehb. fil.*

Completely covering dry banks like moss at Telôm. Very abundant at some spots.

371. *P. UNCIFERUS*, *Hook. fil.*

On trees, Telôm.

372. *P. CORNUTA*, *Schlechter.*

Gunong Berumban.

373. *P. LANCIFOLIA*, *Schlechter.*

On trees at Telôm and near Cameron's plateau.

374. *P. HASSELTII*, *Schlechter.*

On trees by the river, Telôm. Also occurs in the Tahan Valley in Pahang and Java.

375. *GALEOLA JAVANICA*, *Benth.*

A fine clump of this plant, exactly resembling Blume's figure in Rumphia, t. 69, was found by the plant collector in the Batang Padang valley on the return journey. It bore both flowers and fruit. This is a fine addition to the flora. It is a native of Java, but a drawing of the plant from Assam by Masters and specimens from Ceylon collected by Thwaites show its wider distribution.

376. *TROPIDIA SQUAMATA*, *Bl.*

On drier ridges at Telôm and Gunong Berumban.

377. *APHYLLORCHIS PALLIDA*, *Bl.*

Lower slopes of Gunong Berumban.

378. *LECANORCHIS MALACCENSIS*, *Ridl.*

Telôm Woods.

379. *ANÆCTOCHILUS REINWARDTII*, *Bl.*

Telôm, not plentiful.

380. *ZEUXINE BILOBA*, *n. sp.*

Stem below the leaves succulent, 6 inches tall, with seven or eight internodes. Leaves ovate, lanceolate, petioled, acute, base rounded, $2\frac{1}{2}$ -3 inches long, $\frac{1}{2}$ -1 inch wide, with numerous nerves; petiole $\frac{1}{2}$ - $\frac{3}{4}$ inch long, slender; sheaths ampliate, cylindric, with an acuminate, ovate point, ending in the petiole. Scape 8 inches long, pubescent, basal 6 inches, nude except for some three sheaths with acuminate tips, $\frac{1}{4}$ inch more or less. Raceme lax, about 20 flowered, pubescent. Bracts lanceolate acuminate. Upper sepal lanceolate obtuse, thin, white at tip, red spotted at the base, laterals oblong, obtuse, larger, red hairy, $\frac{1}{4}$ inch long. Petals thin, pale, linear, obtuse, forming a galea with the dorsal sepal and little smaller than it. Lip base saccate, narrowing forwards to the claw of the midlobe, which is short channelled, with a pair of triangular lobes, very small, on the margin. Midlobe of two large, white, obovate, rounded lobes at right angles to the line of the lip. Whole lip $\frac{1}{2}$ inch long and as long across the lobes, calli in the sac of two low short crenulate ridges. Column short, with two low ridges in front. Anther cap long and narrow, lanceolate acuminate, three-fourth the length of the upper sepal. Pollinia large, club shaped, with a large linear oblong disc. Rostellar arms linear, obtuse.

Telôm, on the ridge above the Batang Padang valley.

381. *HETERIA PAUCIFLORA*, *n. sp.*

Stem below the leaves, 5 inches long, internodes $\frac{1}{4}$ inch long. Leaves narrow, lanceate acuminate, hardly narrowed at the

base, 2 inches long, $\frac{2}{3}$ inch wide; petiole $\frac{1}{10}$ inch long; sheaths $\frac{1}{4}$ inch or less, narrowed upwards to the petiole, five ribbed. Peduncle with raceme $3\frac{1}{2}$ inches long, slender below, $2\frac{1}{2}$ inches, nude except for two acuminate sheaths, raceme 1 inch long, six flowered. Rachis pubescent. Bracts lanceolate acuminate, enwrapping the ovary and as long, $\frac{1}{10}$ inch long, glabrous, ovary pubescent. Flowers $\frac{1}{10}$ inch long. Sepals ovate, obtuse, glabrous, red, dotted with white spots (raphides?). Petals white, linear, much narrower. Lip shorter than the sepals, saccate, ovate (when expanded), with the tip rolled up into a tube; calli, two semi-ovate ridges at the base and two fleshy, short, central keels. Column broad and short. Anther large, ovate, acuminate. Pollinia pyriform, elongate, with a large conspicuous, elliptic, thick, fuscous disc. Stigma deep and wide, with long-projecting rounded walls. Rostellum broad, with two distinct subulate points and retuse between. Telóm. Only a single specimen. In the form of the lip perhaps this resembles *H. cristata*, Bl., as much as any. The pollen masses with the large thick disc and the large stigma are unusual.

382. *H. ELATA*, *Hook. fl.*

I obtained this on banks by the track up Gunong Bernumban, near the top, and, having compared it with the figure of the type in *Icnes Plantarum*, 2191, have no doubt that it is the plant intended, which was described from plants collected by Scortechini and by Wray in the Batang Padang valley. The plant I described, however, from Mt. Ophir seems to be distinct. Sir Joseph Hooker had some difficulty in making out the structure of the lip and column. My specimens, however, were good enough to make it out clearly. His description in the "Flora of British India" is so short that it is, perhaps as well, to give a more full one.

Stem very short below the leaves, about 1 inch long. Leaves three or four from near the base, ovate, acuminate; base rounded, 4 inches long, $1\frac{1}{2}$ inch wide, rather prominently three nerved; petiole 2 inches long, rather thick and sheathing for half its length. Peduncle and raceme 18 inches tall, lower part nude, except for three or four distant, lanceolate, acuminate sheaths. Raceme very dense, many flowered, 4 inches long, pubescent. Bracts lanceolate, long, acuminate, cuspidate, $\frac{1}{2}$ inch long, longer than the ovary. The sepals ovate, obtuse, $\frac{1}{10}$ inch long. Petals oblong, obtuse, as long. Lip shorter, ovate, saccate, sides towards the tip thickened and involute, folded, tip ovate, subacute; calli two, thin, oblong, laminae from the inside at the base and one horizontal, obtuse, median. Column short. Anther short, pyriform, beak blunt. Rostellum broad, with two short points, stig-

matic wall broad with two short teeth. Capsule elliptic, $\frac{1}{4}$ inch long, crowned with the persistent column.

Banks on the top of Gunung Berumban. Also obtained by Wray in Batang Padang.

383. *HABENARIA INCONSPICUA*, n. sp.

Whole plant nearly 2 feet tall, very slender base of stem, 4-6 inches, nude except for a few sheaths. Leaves about six, thin, flaccid, lanceolate, acuminate, 3-4 inches long and $\frac{1}{2}$ - $\frac{3}{4}$ inch wide, above a few linear acuminate bracts. Raceme 6-8 inches long, slender. Flowers numerous, subsecund, very small green, rather distant. Bracts lanceolate, acuminate, keeled, $\frac{1}{2}$ inch long; sepals $\frac{1}{10}$ inch long; upper one erect, lanceolate; lower ones deflexed beneath the lip, lanceolate, acuminate. Petals larger, entire, erect, triangular with a broad base. Lip three lobed, central lobe linear, obtuse, about as long as the sepal, three nerved; side lobes filiform, linear, nearly twice as long. Spur slender, cylindric, curved, slightly dilated towards the tip or not, $\frac{1}{2}$ inch long. Column very small; anther cells short, rounded with thick upcurved spurs, nearly as long. Pollinia small with a short pedicel and disc, nearly as long. Stigmatic lobes rounded, small; rostellum linear.

Damp flat ground at Telôm, in forest, but rather open ground. A very inconspicuous plant.

APOSTASIACEÆ.

384. *APOSTASIA WALLICHII*, R. Br.

Woods at Telôm. Common all over the Peninsula.

385. *A. LATIFOLIA*, Rolfe.

Telôm Ridge. This differs from Rolfe's description in its bracts, which, he says, are not so distinctly developed at the base of the panicle as in *A. Wallichii*, R. Br. They are, however, very conspicuous and large, over 1 inch long, lanceolate, acuminate, in these specimens.

SCITAMINEÆ.

386. *GLOBBA CERNUA*, Bak.

The commonest species at Telôm.

387. *GL. PERAKENSIS*, Ridl.

Not rare at Telôm.

388. *GL. REGALIS*, n. sp.

Whole plant 4 feet tall, base nude except for sheaths edged with short stiff hairs, ligule oblong truncate hairy, lamina lanceolate or ovate, lanceolate with a very long narrow point, narrowed slightly to the base and subpetioled, 12 inches long, 3 inches wide; the cusp 1-1 $\frac{1}{2}$ inch long, base and midrib,

on the back, hairy, tip and cusp scabrid. Panicle strict, 18 inches long, with numerous distant branches $\frac{1}{2}$ inch long, bearing two or three flowers, all ivory white. Bracts deciduous lanceolate, $\frac{1}{10}$ inch long; ovary small, globose, glabrous. Calyx campanulate, very short and broad, $1\frac{1}{8}$ inch long, with three short teeth, cuspidate. Corolla tube twice as long pubescent above. Petals $\frac{1}{8}$ inch long, boat shaped, violet. Stamminodes broader, shorter, obovate. Lip narrow oblong shortly bilobed, lobes rounded. Stamen filament $\frac{1}{2}$ inch long, anther elliptic with two linear acuminate deflexed spurs, rising from the base, all bright orange.

Telôm, by stream banks, not rare but few plants in flower. Near *Gl. violaceu*, Ridl.

389. *GL. VALIDA*, n. sp.

Plant about 3 feet tall; sheaths spotted with purple glabrous except on the edge near the mouth which is hairy; ligule retuse with hairy edges, $\frac{1}{10}$ inch long. Leaves elliptic or ovate lanceolate, shortly cuspidate, 7 inches long, 2 inches wide, pale beneath, glabrous. Panicle 18 inches long, with distant rather stout branches 1 inch long, bearing two or three flowers. Bracts caducous. Calyx cupular, $\frac{1}{10}$ inch long, with three cusps. Corolla tube $\frac{1}{2}$ inch long, lobes cymbiform, half as long. Stamminodes linear oblong obtuse, much longer, all orange yellow. Staminal tube $\frac{1}{10}$ inch long. Lip shorter linear oblong retuse. Stamen filament from above lip over $\frac{1}{2}$ inch (whole flower $1\frac{1}{2}$ inch) long. Anther oblong cells slightly divaricate at the base, spurs subulate slender from the base two, shorter than the anther.

Telôm Woods, distinct in the very long staminodes. A big stout plant.

390. *GL. (§ Marantella) MACRANTHERA*, n. sp.

Plants 3 feet or more tall. Leaves ovate to lanceolate-ovate, cuspidate base, shortly cuneate, glabrous, paler beneath; petiole $\frac{1}{10}$ -inch winged to the base; ligule short, rounded, hairy; sheath hairy on the edge. Panicle 8 inches long, slender with distant few-flowered branches, $\frac{1}{2}$ inch long. Bracts persistent linear oblong, nearly $\frac{1}{2}$ inch long and $\frac{1}{10}$ inch wide. Calyx cylindric teeth short, lanceolate, $\frac{1}{4}$ inch long, orange. Corolla tube $\frac{1}{2}$ inch long, lobes ovate lanceolate, upper one hooded yellow, $\frac{1}{4}$ inch long. Stamminodes elongate linear oblong, $\frac{3}{4}$ inch long, yellow. Lip base narrow, lobes divaricate excurved, yellow with a small central orange blotch, fuscous in the centre. Stamen filament very long, $1\frac{1}{2}$ inch long, translucent, spurs four, long acuminate. Telôm, by the stream.

This is peculiar from the great length of the staminodes.
Described from living plants; when dry, the proportions of the flowers are smaller.

It seems allied to *Gl. cernua*, Bak.

391. *CAMPTANDRA LATIFOLIA*, *Ridl.*

Upper part of Gunong Berumban.

Flowers pure white, except for a yellow spot in the mouth.

392. *CONAMOMUM UTRICULOSUM*, *Ridl.*

Telôm Woods, out of flower.

393. *COSTUS*, *sp.*

A number of small plants of a species of *Costus* grew in a damp spot by the river, but there were no signs of inflorescence.

394. *ZINGIBER*, *spp.*

Two species seen out of flower, Telôm Woods.

395. *AMOMUM LAPPACEUM*, *var.*

This plant found at the water-fall near Telôm Camp differs a little from the plant described from Ginting Peras, but not sufficiently to distinguish specifically. The leaves were more linear oblong, sheath margins ciliate. The upper petal oblong, rounded at the tip, pinkish red, central bar yellow, the red part veined with white; the lower ones not half as broad. Lip subquadrate retuse brilliant yellow in the centre, lighter towards the tip. There are two small staminodes at the base. The anther, narrow linear, has a crest entire rounded. The type plant had no staminodes or crest.

396. *HORNSTEDTIA GRANDIS*, *Ridl.*

Very abundant in damp spots by the river, Telôm.

397. *H. MACROCHILUS*, *Ridl.*

In the same locality.

398. *H. VENUSTA*, *Ridl.*

In fruit at the upper part of the Ulu Batang Padang valley.
The fruit is of a brilliant red.

399. *ELETTARIOPSIS EXSERTA*, *Bak.*

This is common about Tapah, but I only found a single flower. It occurs in the Batang Padang valley as far as the river from Jor.

400. *GHOSTACHYS PENANGENSIS*, *Ridl.*

Dry banks at Telôm, out of flower.

401. *CARENOPHILA*, *n. gen.*

Stem tall with large linear oblong acuminate leaves, narrowed at the base, hairy beneath. Inflorescence spicate basal on the rhizome, peduncle short, covered with papery bracts. Calyx bifid, longer than the corolla tube. Corolla tube short, lobes oblong obtuse. Lip entire oblong obtuse narrow. Stamines represented by two short thin oblong lobes at the base of the lip. Anther large oblong with a large-rounded entire crest. Ovary glabrous polished. Fruit globose smooth, deep claret colour.

This plant seems to be nearest allied to *Alpinia*, from which it differs in its entire lip and crested anther and radical spike.

402. *C. MONTANA*, *n. sp.*

Stems about 3 feet tall. Leaves large, sheaths over 6 inches long and $\frac{1}{4}$ inch through, densely yellow hairy at the tip, ligule rounded, woolly hairy, $\frac{1}{4}$ inch long, blade linear oblong acuminate, narrowed to the base, 12-15 inches long, 2 inches wide, above glabrous, beneath densely woolly hairy, with a prominent midrib. Spike 5 inches long, the base thickly covered with ovate papery bracts subacute, rather hairy, dark pink; the lowest $\frac{1}{2}$ inch long, the uppermost large, 3 inches long, $\frac{3}{4}$ inch wide, head 2-3 inches long. Calyx 1 inch long, bifid with mucronate lobes, glabrous pink, longer than the corolla tube. Corolla tube pink, lobes oblong, 1 inch long, white obtuse. Lip a little longer entire with upcurved side, white speckled with red. Stamines two oblong obtuse lobes at the base of the lip. Anther large, oblong white crest, large-rounded entire. Ovary glabrous polished, claret colour. Fruit globose, as large as a big cherry, claret coloured.

Summit of Gunong Berumban.

403. *ALPINIA AURANTIACA*, *n. sp.*

A tall plant, about 6 feet tall. Leaves lanceolate cuspidate narrowed gradually acuminate at the top, less so at the base, 12 inches long, 3 inches wide, above glabrous, beneath softly hairy; petiole slender, 1-2 inches long, pubescent, sheath keeled, pubescent above; ligule $\frac{1}{8}$ inch long, truncate entire edges pubescent. Spike dense 3 inches long, peduncle very short, not projecting from the sheath, rachis thickly pubescent. Lower bract papery ribbed, margin pubescent lanceolate, $1\frac{1}{2}$ inch long; upper bracts more ovate, shorter ovary hairy. Calyx $\frac{1}{2}$ inch long, brown, bilobed, lobes very short, glabrous, third lobe very obscure. Corolla tube as long as the calyx. Petals oblong hooded. Upper one submucronate with a raised rib in the centre grooved, laterals broader, all orange. Lip a little shorter than the petals, broadly obovate, tapering to a point ending in two short cirrhi orange with red streaks on the side lobe. Stamines erect, fleshy, glabrous, rather

large, deep red. Stamen, filament and anther bright orange. Anther oblong retuse crestless.

On the hills leading to Gunong Berumban at about 4,500 feet and at Telôm.

In the colouring this recalls *A. Bafflesiana*, Wall., but it differs in height of plant, short corolla tube, the shape of the lip and the staminodes.

404. *A. (§ CENOLOPHON) PULCHERRIMA, n. sp.*

Stems few, about 2 feet tall or less. Leaves ovate cuspidate, deep green, base rounded, broad, slightly inæquilateral; nerves very fine and inconspicuous, glabrous, 15 inches long, $3\frac{1}{2}$ inches wide; the cusp 1 inch long; petiole 7 inches long, slender sheath, 12 inches long, pubescent, densely brown hairy at the top, ligule short retuse. Raceme pendulous, 10 inches long, pubescent. Flowers about 22, opening one or two at a time. Pedicels $\frac{1}{10}$ inch long, pubescent. Ovary silky. Bracts caducous. Calyx cylindric, dilated above, white, 1 inch long, lobes short ovate acute, tube split on one face. Corolla tube as long as the ovary, lobes broadly oblong blunt white. Lip 2 inches across, broadly orbicular, margins undulate, pale yellow, with red radiating veins. Anther oblong, crest five lobed, central lobe rounded, semi-circular, lateral lobes two on each side; upper one short, triangular acute curved; lower one longer, narrower, lanceolate. Style filiform. Stigma red, small. Fruit fusiform, 3 inches long, $\frac{1}{2}$ inch wide, hairy. Seeds numerous, oblong, black, $\frac{1}{2}$ inch long. Telôm Woods, common. Also at the Semangko Pass in Selangor (Ridley. 12031).

This beautiful plant resembles *A. petiolata*, Bak., but is distinguished by its hairy sheaths, larger orbicular lip and five-lobed anther crest.

405. *DONAX GRANDIS, Ridl.*

Batang Padang valley as far as Jor, then disappearing.

406. *PHRYNIUM MALACCENSE, Ridl.*

A *Phrynium*, very abundant at Telôm in wet spots near the camp, appears to belong to this species. I only found one or two plants in fruit, and saw no flowers.

407. *PH. BASIFLOREM, Ridl., var. NOBILE.*

A very fine variety of this plant was found at Tapah. The leaves, with the petiole, were about 8 feet tall, the blade 15 inches or more long and 6-8 inches across, light green above with dark green base, radiating from the midrib, beneath in young leaves rose colour. The plant formed huge clumps in forest swamps, and is far the grandest of our *Marantaceæ*, recalling some of the *Calatheas* of South America.

408. *STACHYPHRYNIUM GRIFFITHII*, *Schum.*

Also grew in great masses near Tapah, densely covering some of the hill sides in the forests towards Temoh. I found a fresh pig's nest made entirely of this plant, dug up and piled into a long-domed mass.

MUSACEÆ.

409. *MUSA TRUNCATA*, *n. sp.*

Stems, 20 feet tall, 1 foot through at the base, deep brown purple. Leaves, with a thick petiole, 45 inches long, blade with a rounded base, apex truncate, quite straight, the midrib projecting in the form of a filament, 20 feet long, $2\frac{1}{2}$ feet wide, light green. Spike pendulous, about 4 feet long, bud deep violet conic pointed. Bracts deep purple violet, young ones maroon pink, darkening later. Male flowers whitish, shortly stalked, $1\frac{1}{2}$ inch long. Calyx boat shaped, longer than the corolla, four lobed with narrow cuspidate lobes. Fruit narrow cylindric, hardly angled, 5 inches long, in two rows of 11 each.

The common Banana at Telôm; allied to *M. malaccense*, but very much larger. It has much the habit of the cultivated Banana "Pisang Rajah Hudang."

410. *M. VIOLASCENS*, *Ridl.*

Common in the low country, disappears soon after entering the Batang Padang valley.

411. *M. MALACCENSIS*, *Ridl.*

Ascends higher but disappears before Telôm is reached.

AMARYLLIDÆÆ.

412. *CURCULIGO RECURVATA*, *Dryand*, var. *LONGEPEDUNCULATA*.

A form with peduncles 1 foot long and the leaves narrower. Telôm Woods. The same form occurs on the Taiping Hills.

413. *C. LATIFOLIA*, *Dryand*, var. *ANGUSTIFOLIA*.

Cameron's plateau (Messrs. Robinson and Kloss). This form has very narrow grassy leaves, quite glabrous.

BURMANNIACEÆ.

414. *BURMANNIA LONGIFOLIA*, *Becc.*

Gunong Berumban. Nearly out of flower at this time. It occurs all over our hill ranges. The flowers here were pure white.

TACCACEÆ.

415. *TACCA CRISTATA*, *Jack.*

Telôm, by the stream at the camp. A large form with dirty green involucre and flowers.

DIOSCOREACEÆ.

416. *DIOSCOREA LAURIFOLIA*, Wall.

Telôm, edges of Sakai clearings and bank of river.

417. *D. ORBICULATA*, Hook. fil.

Telôm.

418. *D. SATIVA*, L.

Sakai clearings at Telôm, evidently introduced for food.

LILIACEÆ.

419. *PROTOLIRION PARADOXUM*, Ridl. and Groom.

Gunong Berumban and Telôm Ridges.

420. *PELIONANTHES*, spp.

None of these were in flower, and it is difficult to make certain of these plants by fruiting specimens only.

421. *P. STELLARIS*, Ridl.

On the track from Telôm to Kuala Lipis (Messrs. Robinson and Kloss).

422. *P. LURIDA*, Ridl.

Telôm and Ulu Batang Padang.

423. *P. VIOLACEA* var. (?)

A plant with more ovate long-petioled leaves than typical *P. violacea*. It may be a distinct species. Gunong Berumban.

424. *OPHIPOGON INTERMEDIUM* var. *MACRANTHUM*.

Stem woody, covered at the base with the papery white sheaths of the leaf bases. Leaves numerous, grassy linear acuminate, 18 inches long, $\frac{1}{4}$ inch wide, a little paler beneath. Scape (incomplete) 8 inches or more long, basal 6 inches, nude tolerably stout. Flowers few, solitary in the axils, rather distant, white. Bracts linear acuminate, $\frac{1}{4}$ inch long. Pedicels $\frac{1}{2}$ inch long. Flowers campanulate, $\frac{1}{2}$ inch across. Sepals and petals similar, $\frac{2}{3}$ inch long, oblong truncate with a rounded tip, one nerved. Stamens shorter, filaments very short, hardly visible. Anthers linear narrow. Style longer. Cameron's plateau by streams (Messrs. Robinson and Kloss).

The Indian species *O. Wallichianum*, Hook. fil., and *O. intermedium*, Don., are, in the Himalayas, very variable, and the forms of both pass into each other. In the Malay plant the flowers are of the size of *O. Wallichianum* and the leaves as broad as in that species. The anthers are, however, linear or linear oblong and blunt with hardly any filament. Perhaps it is best classed as intermediate between the two under *O. intermedium* var. *macranthum*. The plant is very different from the *O. malayanum*, Ridl., from Perak, and is much more distinctly a Himalayan type.

425. *DISPORUM PULLUM* var. *MULTIFLORUM*.

Stems several, about 2 feet tall, sometimes branched. Leaves lanceolate acuminate, slightly narrowed at the base, 4 inches long, 1-2 inches wide, with a short petiole $\frac{1}{4}$ inch long. Flowers five to six in axillary or subterminal umbels, pedunculate on peduncles, $\frac{1}{2}$ -1 inch long, pedicels 1-1 $\frac{1}{2}$ inch long. Sepals and petals $\frac{1}{2}$ inch long. Sepals lanceolate, oblong cuspidate, $\frac{1}{2}$ inch long, greenish tinged with red saccate at the base, not spurred. Stamens about half as long, filaments broad flat, tapering upwards about as long as the anthers. Anthers thick elliptic with a rounded base and a short prolongation above the cells. Style and stigmas three, linear curved stout, little longer than the stamens. Berry dark blue as big as a pea, one to three or more seeded.

Telôm, sandy woods, near the river, abundant.

This species, which is new to the Peninsula, has, in its large sense, a wide distribution from the Himalayas to Java and China. It varies a good deal in size of flowers, colour and proportion of anther to filament. The Telôm plants exactly resemble Javanese plants collected by Hullett, except that in these the anther is much shorter than the filament. The Javanese plant is given by Miquel as *D. parviflorum*, Don. Syn., *D. Horsfieldii*, Don., and its sepals are said to be puberulous, which Hullett's and my specimens are not.

426. *DEACENA GRACILIS* var.

River bank at the cascade. Telôm. A large form with big leaves.

427. *D. GRAMINIFOLIA* var. *ANGUSTISSIMA*.

Jor.

428. *D. AURANTIACA*, Wall.

Ascends to about 2,000 feet in the Batang Padang valley.

429. *DIANELLA ENSIFOLIA*, Red.

Telôm.

430. *SMILAX LAEVIS*, Wall.

Telôm.

431. *SM. EXTENSA*, Wall.

Near Jor. A form with the leaves thinner and more elliptic.

432. *SM. MYOSOTIFLOEA*, A. DC C.

Gunong Berumban.

433. *SM. LEUCOPHYLLA*, Bl.

At Telôm. Out of flower, but unmistakable.

434. *TRICALISTRA*, *new genus*.

Stem woody, creeping. Leaves large, oblanceolate petiolate subcoriaceous. Spike axillary erect. Bracts ovate obtuse. Flowers small, sessile campanulate with short lobes. Sepals and petals similar. Stamens superior six, short. Anthers oblong. Pistil short, subcylindric. Style absent, stigmas three, hippocreniform sessile ovary, one-celled ovules two. Fruit drupaceous green, large, globose, one seeded.

435. *TR. OCHRACEA*, *n. sp.*

Stem thick, $\frac{1}{2}$ inch through, woody. Leaves oblanceolate acuminate, narrowed at the base to the petiole, glabrous, dark green, thinly subcoriaceous; 12 nerved, 16 inches long, 4 inches wide; petiole 6 inches long. Spike 8 inches tall, base for more than half nude, four angled. Bracts ovate, rounded at the tip, caducous, $\frac{1}{2}$ inch long. Flowers sessile, tube basin shape, lobes all similar short recurved ovate blunt, all dull ochreous yellow. Stamens six short in the mouth of the tube, filaments short, anthers oblong. Pistil cylindric, three lobed, short. Stigma three lobed, lobes rounded. Fruit unripe, globose, as large as a bullet, green.

Telôm Woods, to the slopes of Gunung Berumban. A plant with the habit of *Susum malayanum*, Hook. fil., but with a rather short stout rhizome, sometimes partly erect. The flower spike is fleshy and densely covered with small pale yellow flowers of the form of those of *Tupistra*, but differing from any described plant of this group in the absence of any style, the trilobed stigma being sessile on the truncate top of the short ovary. This and the general structure of the flower suggest an affinity with *Peliosanthes*, to which group I would refer it, were it not for the fruit which is drupaceous with a single seed. Unfortunately, I was not able to find a ripe fruit, which is, indeed, rare to find in any of the *Aspidistreae*; but it is clear that the fruit is similar to that of *Tupistra*. The ovary in section shows traces of three carpels, but only one contains any ovules.

COMMELINACEÆ.

436. *POLLIA THYRSIFLORA*, *Endl.*

Ulu Batang Padang.

437. *P. SOEZOGONENSIS*, *Endl.*

On the track to Jor, Ulu Batang Padang.

438. *COMMELINA OBLIQUA*, *Ham.*

On the river bank at Telôm in sandy and muddy parts. Its large blue flowers make it quite attractive. I have met with it, too, at Ginting Bidei in Selangor, but it does not appear to be common in the Peninsula.

439. *ANEILEMA PROTENSUM*, Wall.

Herb with weak stems, about 2 feet tall, glabrous. Leaves lanceolate acuminate acute, narrowed gradually to the petiole, quite glabrous, 4-6 inches long, $\frac{1}{2}$ -1 inch wide; petiole $\frac{1}{2}$ inch long; sheath tubular, $\frac{1}{2}$ inch long, the mouth ciliate, otherwise glabrous. Panicle very lax spreading, widely with branches, very slender, 4 inches long, quite glabrous. Lower bracts with a narrow oblong limb. Upper bracts cup shaped, acute ovate, $\frac{1}{16}$ inch long, persistent. Sepals ovate obtuse, not reflexed, small. Petals three, orbicular clawed, pure white. Stamens five, two with linear yellow anthers and white glabrous slender filaments one anther, reniform, and two with a slender brown filament, bifurcating and ending in two globose yellow balls. Pistil densely grey hairy. Style simple acuminate, minutely capitate. Fruit subglobose, narrowed below, densely covered with grey-hooked bristles and strongly adhesive, $\frac{1}{10}$ inch through. Seeds three, oblong convex on the back, angled within, white, transversely rugose. Telôm in damp spots by the river.

Distrib.—Of type India, Sumatra and Java.

I have considered it best to describe this plant under the name of *A. protensum*, Wall., as it certainly closely resembles Wight's figure, t.c. 2071; but his figure and description of the stamens do not coincide with those of the Telôm plant. The figure in Clarke's *Commelinaceæ*, t. 24, of *A. protensum*, does not bear the least resemblance to either the Telôm plant or to Wight's figure. It represents a whole plant and seed and a copy of Wight's drawing of the flower. The Telôm plant is quite glabrous, and the panicle is not viscid as described in *A. protensum*. None of the describers mention that the fruit is armed with hooked bristles, making it very adhesive, but Wight's figure shows something like this. *A. scaberrimum*, Kunth. (*Commelina scaberrima*, Bl.), does not fit it in the least.

440. *FLOSCOPA SCANDENS*, Lour.

Ulu Batang Padang. Common all over the Peninsula.

441. *FORRESTIA GLABRATA*, Bl.

A stout, tall, almost completely glabrous herb. Stems $\frac{1}{2}$ inch through. Leaves lanceolate acuminate with a long point and gradually narrowed to the sheath, 8 inches to nearly 12 inches long, 2 inches wide, completely glabrous, except for the scanty marginal hairs, sheaths 1-1 $\frac{1}{2}$ inch long, finely ribbed glabrous, except some white cilia at the edge. Capitula compact, 1 inch through or less, quite glabrous. Sepals oblong obtuse, $\frac{1}{2}$ inch long, keeled, quite glabrous. Fruit elliptic oblong with a rounded top, subtrigoneous pale, much shorter than

the sepals, $\frac{1}{2}$ inch long, glabrous, and terminated by the slender style. Seeds two in each cell convex red brown, cerebriform. Telôm. A new record for the Peninsula,

Distrib.—India, Java, Sumatra and Tonkin.

442. *F. MARGINATA*, Hassk.

Telôm. This plant appears very variable, or there is more than one species included under the name.

443. *F. MONOSPERMA*, Clarke.

Ulu Batang Padang near Jor in damp ravines. Usually found in the neighbourhood of limestone rocks.

JUNCACEÆ.

444. *JOINVILLEA MALAYANA*, Ridl.

On banks on a ridge, about a mile from the Telôm Camp. In flower and fruit, the drupes bright red.

445. *SUSUM MALAYANUM*, Bl.

Telôm Woods. The form with large fruits as big as a cherry.

PALMÆ.

446. *ARECA PUMILA*, Bl.

Woods near Telôm. The leaflets seem narrower than those of the Larut Hills, but I think it is specifically the same. The stems were solitary, about 6 feet tall.

447. *PINANGA SCORTECHINII*, Bacc.

Telôm Woods.

448. *P. (§ Spirantha) DENSIFOLIA*, n. sp.

A tufted plant, forming thick bushes. Stem about 9 or 10 feet tall, $\frac{1}{2}$ inch thick. Leaves long, finely cut into narrow leaflets, rachis trigonous yellowish, leaflets very numerous, narrow linear acuminate, long cuspidate, dark green, nerved, 15 inches long, $\frac{1}{4}$ inch wide, terminal pair broad, 6 inches long, 1 inch wide. Spathe broadly lanceolate ovate, shortly beaked, smooth, 7 inches long, 2 inches wide, inner flange $\frac{1}{2}$ inch wide. Spadix of five to eight rather stout branches on a short, 1 inch long, broad peduncle decurved, 6 inches long. Flowers in four rows. Males $\frac{1}{4}$ inch long. Sepals short ovate triangular, hardly acute. Stamens 10 filaments, very short, with a broad base, abruptly acuminate. Anthers linear oblong, shorter than the petals. Females $\frac{1}{15}$ inch long, globose. Sepals rounded glabrous, petals about as long. Fruit elliptic, narrowed to both ends, little more than $\frac{1}{2}$ inch long. Seed elliptic smooth with thick ruminations, few, running nearly to the centre. Very abundant on the ridges behind Telôm on both sides of the river. In some places so abundant as to exclude almost anything else. The plant forms great tufts, much resembling those of *Chrysalidocarpus lutescens*.

449. *P. POLYMORPHA*, *Becc.*

This species was based on a plant collected in Perak by Scortechini, and is well marked and not really very variable. In King's distribution of the Wray and Scortechini collections, however, he distributed a very distinct plant as *P. polymorpha* var. *robusta*, and another as var. *minor*. The latter is obviously what Beccari intended and should be kept for that. It is extremely abundant in the Telóm Woods, forming quite dense thickets, and at first sight much resembles *Pinanga disticha*, Bl., even to the dark and light green mottling of the leaves.

A more full description of it, taken from life, may serve to distinguish it readily.

A slender-creeping ascending palm, from 4 to 6 feet tall, branched from the base, the stems $\frac{1}{4}$ inch through. Leaves 12-14 inches long. Sheaths 3-4 inches long, the blade broken up into two to four pairs of leaflets, the lower ones narrow acuminate or broad, strongly nerved, 7 inches long, up to 6 inches across the blade or more, mottled light and dark green as in *Pinanga disticha*. Ligule usually breaking up into fibres and soon disappearing. The petiole 3 inches long. Spathe 2 inches long, papery lanceolate. Spadix $1\frac{3}{4}$ inch long, flexuous with two branches on a peduncle, $\frac{3}{4}$ inch long, rachis red eventually. Flowers distant, spirally arranged. Male flowers, petals ovate triangular, shortly acuminate, $\frac{1}{4}$ inch long. Females, sepals short rounded, ciliate, petals narrower, hardly longer. Fruit black, $\frac{1}{2}$ inch long, narrowed at both ends, when dry, deeply ruminant.

Telóm Woods. The plant collected by Wray on Gunong Berumban Puteh (365) belongs here and not to *P. disticha* as I previously referred it. The Singapore Lobb plant is, however, doubtless *P. disticha*, which is a lowland plant and not a highland one.

450. *P. SUBINTEGRA*, *Ridl.*

Abundant at Telóm. This plant resembles *P. subruminata* at first sight very closely, and is usually about the same size, about 2 feet tall. Its large brilliant red fruit on much longer spikes and leaves almost rounded at the base distinguish it easily. I add the following notes to my original description: Leaves oblong obtusate, base only shortly and slightly narrowed, lobes 3 inches long. Lower sheaths 3 inches long. Flowers sunk in long elliptic oblong depressions with a short acute point (Bract) above. Sepals glabrous, $\frac{1}{10}$ inch long. Fruit, in life, elliptic pulpy, red, when dry, cylindric.

451. *ARENGA WESTERHOUTI*, *Griff.*

Common in the Batang Padang valley to the Pahang border, but not seen beyond,

452. *CARYOTA*, *sp.*

A big *Caryota* was seen in the Batang Padang valley and small plants in the Telôm Woods. They were probably *C. obtusa* var. *aequatorialis*.

453. *LIVISTONA COCHINCHINENSIS*, *Mart.*

In the Batang Padang valley. Some trees of immense size, disappearing as the Pahang boundary ridge was reached: but a small seedling was found near the Telôm Camp.

454. *EUGELSSONA TRISTIS*, *Griff.*

The "Bertam" disappears on leaving the plains at about the 12th mile from Tapah.

455. *ORANIA MACROCLADUS*, *Griff.*

Goes to about the 12th mile and then ceases.

456. *DAMONOROPH PERIACANTHUS*, *Mart.*

A small form on the Telôm Ridges.

457. *CALAMUS FILIPENDULUS*, *Becc.*

Telôm Woods.

458. *C. CURTISII*, *Ridl.*

Telôm. The fruits of this were obtained for the first time. They resemble those of *C. exilis*, (Griff., of Mt. Ophir. They are cylindric fusiform, beaked at the tip and supported in the tubular cylindric perianth, $\frac{1}{2}$ inch long. The scales small, in 10 rows, pale buff, edged and tipped with brown, longer than broad, and rounded at the tip.

459. *C. PERAKENSIS*, *Becc.*

Abundant at Telôm on the higher ridges and on Gunong Berumban.

460. *C. JAVENSIS* var. *PURPURASCENS*.

Plants were seen, not in flower, of this species at Telôm.

461. *C. ELEGANS*, *Ridl.*

I was fortunate enough to get complete specimens of this rattan, which was only known from a portion of a leaf and spadix, which I got on Bujang Malacca some years ago, and some doubtful specimens and drawing of Wray and Scortechini. I am, therefore, able to give now a full description of the plant.

The stem was $\frac{1}{4}$ inch or rather more through, of a dark colour, thickly armed with flattened spines, singly or in threes together, and $\frac{1}{4}$ inch long or less. Leaf 4 feet long with a spiny base, spines short terete with a broad pale base; petiole 15 inches long; leaflets in distant fascicles of five or six, 4-6 inches apart, narrow lanceolate linear acuminate, 8 inches long by $\frac{1}{2}$ inch wide, dark green, not setulose.

with scattered thorns on the slender rachis; flagellum terminal, 18 inches long, slender with black-tipped thorns in threes. Male spadix very slender filiform, 3 feet long, branches about three, 8-9 inches long; the lowest sheath 2 inches long, with a few short sharp straight thorns on the edge; upper sheaths with one or two very small-hooked thorns, internodes with one or two minute thorns, sheaths of the branches short, gradually dilate, unarmed, with a short point. Spikes 20, $\frac{1}{2}$ -1 inch long. Bracts ovate acute, strongly ribbed. Spathel- lules ribbed. Calyx campanulate, lobes ovate subacute, ribbed. Petals oblong obtuse, twice as long. The whole flower $\frac{1}{16}$ inch long. Female spadix 3 feet long, slender, armed as in male, branches few, two 5-6-inches long spikes, about 6 inches each, 1-1 $\frac{1}{2}$ inch long. Flowers about 20 on each, rather distant. Calyx and corolla as in the male, style stout. Fruit cylindric oblong, beaked, $\frac{1}{4}$ inch long; beak $\frac{1}{16}$ inch long. Scales in six rows, yellow, edged with brown convex and grooved rather deeply.

Telôm, hill woods.

462. *PLECTOCOMIA GRIFFITHII* var.

A species of *Plectocomia* was abundant on the Telôm Woods, but only portions of decayed spathels were seen. These and the plant itself resembled *P. Griffithii*, Becc.; but were very much smaller, probably a mountain form.

463. *KOETHALSIA*, sp.

No flowers or fruit, near *K. ferox*, Becc. Telôm Woods.

464. *PLECTOCOMIOPSIS GEMINIFLORUS*, Becc.

Common in the Batang Padang forests near Jor. *Calamus turbinatus*, Ridley, must be reduced to this. It was based on a fruiting specimen, the fruit not having been previously described, and differing from that of other species of the genus in having the regular scales of a *Calamus*.

PANDANACEÆ.

465. *PANDANUS ORNATUS*, Kurz.

Cameron's plateau. (Messrs. Robinson and Kloss).

466. *P. COLLINUS*, Ridl.

A branched, rather bushy, Pandan from 8-12 feet tall, forming large tufts with narrow leaves, glaucous beneath. Fruit glaucous green.

Very common on the Telôm Ridge and on other high ridges between that and Berumban. Also collected on Gunong Batu Puteh by Wray and on Kedah Peak by myself.

Several species of *Freycinetia* were seen at Telôm, but none showed signs of flowers. One was apparently *F. lucens*, Ridl.

AROIDÆÆ.

467. *ARISÆMA ROXBURGHII*, Kunth.

Ulu Batang Padang and Telôm.

468. *A. ANOMALUM*, Hemsl.

Telôm in damp shady spots, not rare.

469. *A. WRAYI*, Hemsl.

Telôm Woods, less common.

470. *A. FILIFORME*, Bl., var.

A very fine *Arisæma*, with a large rich brown spathe, was brought by Messrs. Robinson and Kloss from their trip to Gunong Irau, and I obtained one or two more specimens from the low-lying woods of Cameron's plateau near Gunong Berumban. This plant agrees very well with the figure of Blume's *A. filiforme* and the description in "*Rumphia*," except in a few points, and with some specimens from Mt. Gedle in Java, collected by Mr. Hullett, which I take to be *A. filiforme*. The plant collected on the expedition had leaves about 1 foot tall, with three ovate cuspidate leaflets with rounded bases, the outer pair oblique, 4-5 inches long and 3 inches wide; the nerves, usually few, meet in intra-marginal arches; petiolules $\frac{1}{2}$ inch long. The peduncle is 4 inches or more tall. The tube of the spathe 1 inch long and broad, the limb oblong broad cuspidate, 4 inches long and 2 inches wide, with a 2-inch point, the edges are widely everted. It was of a dark maroon brown colour. The spadix white, the appendage conic at the base, gradually passing into the long filiform tail, the conic portion about 1 inch long, bears a number of short subulate processes, occasionally branched, the tail is $3\frac{1}{2}$ inches long. All the plants found were males. The flowers consisted of five or six anthers borne on a short stalk, and were dispersed over the male portion.

Mr. Hullett's plants closely resembled mine, except in the anthers being in twos or threes and sessile, as is described and figured by Blume. Blume states that the leaflets are usually more than three, and his figure shows a different spathe, colouring much paler, and these distinctions, however, in such variable plants as *Arisæmas*, are hardly sufficient to constitute a distinct species.

471. *AMORPHOPHALLUS BUFO*, n. sp.

Tuber hemispheric, about 3 inches across. Leaf about 4 feet tall, petiole fairly stout, mottled grey and green, lamina about 18 inches across, much divided lobes, ovate to lanceolate, cuspidate decurrent, nerves numerous and fine. Peduncle 3 feet tall, $1\frac{1}{2}$ inch through at the base, mottled and blotched,

greenish grey with six fuscous-purple spots darker purple in the base of the tube. Spathe tube 3 inches long, and as wide at the mouth, limb very broad, 6 inches long, 4 inches across, oblong ovate in front, curiously blotched with circular greenish blotches with a brown purple back ground, back paler olivaceous with pale greenish spots. Spadix 6 inches long, appendage a blunt cone cylindric, 3 inches long and 1 inch through, dull purple. Male portion yellowish cylindric, 1 inch long, anther cells two, parallel; flowers oblong crowded. Female portion $\frac{1}{2}$ inch long, pistils very shortly stalked or rather narrowed at the base, style cylindric distinct, stigma discord, very crowded.

Abundant all over the low-lying parts of the Telôm Woods. The great abundance of this *Amorphophallus* showed the scarcity of wild pigs. In Borneo and Johore, where these animals abound, *Amorphophalli* are scarce or, if fairly abundant, the tubers are deeply buried beneath big roots or under rocks, where the pigs cannot get them. The Sakais had practically exterminated the pigs here, hence the abundance of *Amorphophalli*, whose tubers were only just below the surface. This species is, perhaps, as near *A. carnea*, Ridl., as any other species. Its curiously-mottled spathe with its circular blotches of dull green on a purplish ground, and its shape, reminds one of the head of some curiously-blotched reptile.

472. *ALOCASIA DENUDATA*, Engl.

Telôm, large and typical.

473. *A. BECCARII*, Engl.

Telôm Ridges in dry spots.

474. *AGLAONEMA ANGUSTIFOLIUM*, N. E. Br.

A broad-leaved form passing towards *A. schottianum*, Miq. Telôm.

475. *A. OBLONGIFOLIUM*, Schott.

By the Batang Padang River, not seen further than Tapah side.

476. *HOMALOMENA PUMILA*, Hook. fil.

A considerable variety of forms, as far as the shape of the leaf goes, were at Telôm, from the typical little green round-leaved form to forms with elongate rhizomes and long-petioled leaves passing towards *H. propinqua*, Ridl. The purple-leaved variety *purpurascens* grew also on damp banks of the streams.

477. *SCHISMATOGLOTTIS CALYPTREATA*, Zoll.

Var. *concolor*, Hallier, was commonest, var. *picta* scarcer and var. *albidomaculata* was local. All about Telôm,

478. *S. RUPESTRIS*, Zoll.

Telôm. I take this species, especially marked by the long bare space between the male and female flowers, to be what is intended by the above name. It has only previously been recorded from Java.

479. *PIPTOSPATHA ELONGATA*, Ridl.

Abundant in all the rocky streams at Telôm and in the Batang Padang valley, often apparently thriving completely and permanently under water. There is a form in the Telôm River with the leaves spotted light green on a darker ground like the typical form of *P. Ridleyi*. It grows with the plain green form.

480. *SCINDAPSUS PICTA*, Hassk.

Common at Telôm, as all over the Peninsula.

481. *Sc. SCORTECHINII*, Hook. fil.

Telôm Ridge and Gunong Berumban up to 6,000 feet altitude.
Common.

482. *RAPHIDOPHORA HUMILIS*, Ridl.

Abundant on dry banks, Telôm.

483. *R. GIGANTEA*, Ridl.

Telôm Camp.

484. *R. WRAYI*, Hook. fil.

Common on trees at Telôm.

485. *R. LÆTEVIRENS*, Ridl.

Seen near Jor.

486. *R. BECCARII*, Engl.

On rocks at the Telôm cascade, not in flower.

CYPERACEÆ.

487. *MARISCUS SIEBERIANUS*, Nees.

In a Sakai clearing at Telôm, doubtless introduced by the Sakais.

488. *GAHNIA JAVANICA*, Moritzi.

Top of Gunong Berumban.

489. *SCLERIA MULTIFOLIATA*, Baeckl.

Some very weak forms at Telôm.

490. *SCL. CHINENSIS*, Kunth.

Telôm.

491. *SCL. ELATA*, Thw.

A very tall plant, about 12 feet tall, very stout, abundant; but nearly out of flower.

492. *CAREX CRYPTOSTACHYS*, *Brugn.*

Woods, Telôm.

493. *C. PERAKENSIS*, *Clarke.*

Abundant on Gunong Berumban, and conspicuous from its whitish spikelets. Sporadic plants at Telôm also.

494. *C. BACCANS*, *Nees.*

On Gunong Berumban and also on Telôm Ridges.

A new addition to the flora.

Distrib.—India and Java.

GRAMINEÆ.

495. *PASPALUM CONJUGATUM*, *Berg.*

This grass has established itself in great abundance on the old Sakai clearings and covers the open parts of the tracks to them.

496. *ISACHNE ALBENS*, *Trim.*

Telôm Camp, also occurs on the Larut Hills.

497. *PANICUM MYOSUROIDES*, *Br.*

A few plants at the camp at Telôm.

498. *P. PLICATUM*, *Lam.*

Abundant at the Sakai camps, Telôm.

499. *P. MONTANUM*, *Rorb.*

Telôm, near the camp.

500. *P. ORYZOIDES*, *Sw.*

Ridge between Telôm and the Batang Padang valley.

501. *P. FILIPES*, *Nees.*

Abundant. Telôm Camp.

502. *P. PATENS*, *Linn.*

Telôm Camp and Sakai clearings.

503. *ICHTHANTHUS FALLENS*, *Munro.*

Ridge between Telôm and Batang Padang valley.

504. *THYSANOLAENA AGROSTIS*, *Nees.*

Telôm Camp and river bank.

505. *OPLISMENUS COMPOSITUS*, *Beauv.*

Rocky places and stream banks in the Telôm Valley, very tall forms.

506. *MISCANTHUS SINENSIS*, *Anderae.*

On the ridges between Telôm and Batang Padang and large clumps at the camp. This grass has not been recorded before from the Peninsula. It is conspicuously abundant in Sarawak, Borneo. According to the description in Haeckel's

" Monograph " of *Andropogonew*, the leaf edges of this grass are scabrid as they are in a specimen I have from Japan, but they are not so in Borneo and Malayan plants. The distribution given for this plant is China, Japan and Borneo.

507. *POGONATHERUM SACCHAROIDEUM*, *Beauv.*

On rocks in a stream cascade on the Jor track about the 12th mile from Tapah.

508. *POLLINIA CILIATA*, *Trin.*

Sakai clearing at Telôm, plentiful. An Indian species, which I also found in Eastern Pahang.

509. *GARNOTIA STRICTA*, *Brugu.*

A slender-tufted grass, growing abundantly in the rocks in the river at Telôm and often submerged. A new record for the Peninsula. Its recorded distribution is India and the Sandwich islands. I have it too from S. Borneo.

510. *LOPHATHERUM GRACILE*, *Brugu.*

Common and tall in more open spots all over the Telôm Woods.

511. *CENTOTHECA LAPPACEA*, *Desv.*

In the Batang Padang valley common, but curiously enough. I could not find it at Telôm.

512. *DENDROCALAMUS PENDULUS*, *Ridl.*

On the Jor track.

513. *D. GIGANTEUS*, *Munro.*

Fine clumps of this Bamboo occurred in the Batang Padang valley.

514. *SCHIZOSTACHYUM ZOLLINGERI*, *Steud.*

Flowering specimens in a bad state, of what appears to be this species, were obtained on the Jor track.

515. *BAMBUSA ELEGANS*, *Ridl.*

Top of Gunong Berumban and covering it with a dense low thicket. Also occurs in the Semangko Pass.

FERNS.

516. *GLEICHENIA FLAGELLARIS*, *Spr.*

Abundant at Telôm.

517. *GL. GLAUCA*, *Hook.*

As common as the last.

518. *ALSOPHILA COMOSA*, *Hook.*

Telôm.

519. *A. GLABRA*, *Hook.*

Telôm.

520. *A. DUBIA*, *Bedd.*
Gunong Berumban.
521. *A. GLAUCA*, *Sw.*
Common about Telôm and on the Batang Padang valley.
522. *A. CRENULATA* var.
I am doubtful as to this. The pinnules are not crenulate and the sori in a single row close to the bases of the pinnules.
Telôm.
523. *CIBOTIUM BAROMETZ*, *Link.*
In the Batang Padang valley, abundant
524. *LECANOPTERIS CARNOSEA*, *Bl.*
Telôm Ridge and common around Telôm.
525. *HYMENOPHYLLUM NEESII*, *Hook.*
Telôm.
526. *H. JAVANICUM*, *Spreng.*
Gunong Berumban; Telôm.
527. *H. POLYANTHOS*, *Sw.*
Telôm.
528. *H. AFFINE*, *V. D. Borch.*
Telôm and Gunong Berumban.
529. *H. DENTICULATUM* var. *FLACCIDUM*.
Telôm.
530. *TRICHOMANES PALLIDUM*, *Bl.*
Telôm, not very common.
531. *T. DENTICULATUM*, *Bl.*
Telôm.
532. *T. PLUMA*, *Hook.*
Gunong Berumban.
533. *T. BIPUNCTATUM*, *Poir* (= *T. filicula*, *Bong*).
A large form at Telôm.
534. *T. MAXIMUM*, *Bl.*
Telôm, near the small water-fall.
535. *T. OBSCURUM*, *Bl.*
Telôm.
536. *HUMATA PINNATIFIDA*, *Bak.*
On banks at Telôm and Gunong Berumban, plentiful.
537. *PROSAPTIA EMERSONI*, *Presl.*
Telôm Ridge.

538. *P. CONTIGUA*, *Sw.*
Telôm and Gunong Berumban.
539. *DAVALLIA BULLATA*, *Wall.*
Gunong Berumban.
540. *D. LORRAINEI*, *Hance.*
Telôm. New to the flora.
541. *D. SOLIDA*, *Swartz.*
Telôm Camp. Common.
542. *D. MOLUCCANA*, *Bl.*
An extremely handsome and large *Davallia* on the banks of the stream by Telôm Camp. New to the flora.
543. *MICROLEPIA PINNATA*, *Car.*
Common at Telôm and by the Batang Padang River.
544. *STENOLOMA CHINENSIS*, *Swartz.*
Batang Padang valley near Jor.
545. *LINDSAYA REPENS*, *Thur.*
Telôm.
546. *SCHIZOLOMA LOBATA*, *Bl.*
Telôm and Gunong Berumban.
547. *LITOBROCHIA INCISA*, *Thunb.*
Gunong Berumban.
548. *PTERIS AQUILINA*, *L.*
Telôm Camp.
549. *PLAGIOGYRIA EUPHLEBIA*, *Kze.*
On the top of Gunong Berumban.
550. *BLECHNUM ORIENTALE*, *L.*
Telôm, near the camp.
551. *THAMNOPTERIS NIDUS*, *L.*
Common round Telôm Camp.
552. *ASPLENium SCORTECHINII*, *Bedd.*
Gunong Berumban.
553. *A. NORMALE*, *Don.*
Telôm.
554. *A. BELANGERI*, *Kze.*
Common round Telôm Camp.
555. *A. RESECTUM*, *Hook.*
Telôm.
556. *DIPLAZIUM SUBSEBRATUM*, *Bl.*
Trees, Telôm.

557. *D. ASPERRIMA*, *Bl.*
Telôm.
558. *ANISOGONIUM LINEOLATUM*, *Mett.*
Telôm and Gunong Berumban.
559. *A. DECUSSATUM*, *Sw.*
Common by the banks of the Telôm River in damp spots. A very large fern.
560. *A. HETEROPHLEBIUM*, *Presl.*
At Telôm. A new record for the Peninsula.
561. *DIDYMOCHLÆNA LUNULATA*, *Desv.*
Banks of the stream by Telôm Camp, near the water-fall.
562. *ASPIDIUM VASTUM*, *Bl.*
Common in the Batang Padang valley.
563. *A. RIDLEYI*, *Christ.*
But the leaves are dentate.
Abundant. Telôm.
564. *LASTREA CALCARATA*, *Bl.*, var. *SERICEA*.
Banks of the Batang Padang River and Telôm.
565. *L. DAYI*, *Bedd.*
Telôm and upper part of Gunong Berumban.
566. *NEPHRODIUM UNITUM*, *L.*
Telôm.
567. *N. LINEATUM*, *Bedd.*
Telôm.
568. *N. PAHANGENSE*, *Christ* (sub. *DEYOPTERIS*).
Telôm cascade.
569. *N. HETEROCARPUM*, *Christ.*
Telôm.
570. *N. LARUTENSE*, *Bedd.*
Telôm.
571. *ATHYRIUM CAEVIFOLIUM*, *Christ, n. sp.*
Gunong Berumban.
572. *NEPHROLEPIS DAVALLOIDES*, *Kze.*
Telôm.
573. *OLEANDRA NERIIFORMIS*, *Car.*
Telôm Ridge and Gunong Berumban.
574. *PHYGOPTERIS HASSELTII*, *Bl.*
Telôm.
575. *POLYPODIUM TRICHOMANOIDES*, *Sw.*
Telôm Hills on the route to Gunong Berumban.

576. *P. MALACCANUM*, *Bak.*
Gunong Berumban.
577. *P. OBLIQUATUM*, *Bl.*
Common at Telôm, on trees.
578. *DIPTERIS HORSFIELDII*, *Br.*
Common on dry ridges, Telôm.
579. *DEYNARIA HERACLEUM*, *Kze.*
Abundant at Telôm and up towards Gunong Berumban.
580. *PLEOPELTIS WRAYI*, *Bak.*
Gunong Berumban.
581. *PL. ACCEDENS*, *Bl.*
Common on trees, Telôm.
582. *PL. RUPESTRE* var. *UNISERIALE* n. var., *Christ.*
Telôm.
583. *PL. PLATYPHYLLA*, *Sw.*
Dry spots, Telôm Ridge.
584. *PL. PALMATA*, *Bl.*
Gunong Berumban.
585. *PL. INCURVATA*, *Bl.*
Gunong Berumban.
586. *PL. PUNCTATA*, *L.*
Telôm. Common.
587. *PL. LEIORRHIZON*, *Hook.*
Telôm. New record for Peninsula.
588. *PL. ANGUSTATUM*, *Bl.*
Telôm.
589. *MONOGRAMME PARADOXA*, *Fee.*
Telôm.
590. *M. TRICHOIDEA*, *Sm.*
Telôm.
591. *LOXOGRAMME INVOLUTA*, *Don.*
Telôm with a curiously-branched form.
592. *SYNGRAMME QUINATA*, *Hook. fil.*
Telôm Ridge. A new record for the Peninsula.
593. *ANTROPHYUM RETICULATUM*, *Kaulf.*
On rocks and trees at Telôm cascade. A very large form.
594. *VITTARIA FALCATA*, *Kze.*
Gunong Berumban.
595. *TÆNITIS BLECHNOIDES*, *Sw.*
Dry spots, Telôm.

596. *ELAPHOGLOSSUM CONFORME*, *Sw.*
Telôm.
597. *STENOCHLÆNA SORBIFOLIA*, *L.*
Telôm. Common.
598. *GYMNOPTERIS SPICATA*, *Linn. fil.*
Telôm, in dry spots on trees.
599. *G. FLAGELLIFERA*, *Wall.*
Muddy spots by Telôm River.
600. *CHREYSODIUM BICUSPE*, *Hook.*
Dry banks at Telôm.
601. *ANGIOPTERIS ERECTA*, *Hoffn.*
Very fine and of immense size on islets and banks of Telôm River. Abundant.
602. *KAULFUSSIA ÆSCULIFOLIA*, *Bl.*
Batang Padang valley.
603. *OPHIOGLOSSUM MALACCANUM*, *Schlechter (O. petiolosum, Desv.).*
In crevices of rocks in the Telôm River.

LYCOPODIACEÆ.

604. *LYCOPODIUM PHLEGMARIA*, *Hook.*
Telôm and Gunong Berumban. Some specimens had the ends of the fruit spikes terminated by a tuft of leaves.
605. *L. squarrosus*, *Forst.*
Telôm. This, too, had the fruit spikes terminated by a tuft of leaves.
606. *L. CASUARINOIDES*, *Spr.*
Telôm, ridges at 5,000 feet altitude.
607. *L. LUCIDULUM*, *Wt.*
Sporadic and scarce, Telôm.
608. *SELAGINELLA PLUMOSA*, *Presl.*
Telôm.
609. *S. PLUMEA*, *Spring.*
Telôm.
610. *S. CANALICULATA*, *Spring.*
Telôm.
611. *S. TENERA*, *Spring.*
Gunong Berumban.
612. *S. PRONIFLORA*, *Bak. (?)*
But differs from the type in having the leaves not ciliate.
Telôm.

ON MAMMALS FROM THE RHIO ARCHIPELAGO AND
MALAY PENINSULA COLLECTED BY MESSRS. H. C.
ROBINSON, C. BODEN KLOSS AND E. SEIMUND, AND
PRESENTED TO THE NATIONAL MUSEUM BY THE
GOVERNMENT OF THE FEDERATED MALAY STATES.

BY OLDFIELD THOMAS, F.R.S., AND R. C. WROUGHTON, F.Z.S.

WITH NOTES.

BY THE COLLECTORS.

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DURING 1908 Mr. H. C. Robinson, Director of Museums, Federated Malay States, and his assistant Mr. E. Seimund made a collecting trip to the Rhio Archipelago, south of Singapore, and obtained a magnificent series of mammals, prepared in the best modern manner, and forming a very full representation of the Mammal Fauna of the islands. This collection was supplemented by a series of other specimens obtained in Singapore itself and on the coast of S.-E. and E. Johore and the adjacent islands, as well as by other specimens from the vicinity of Kuala Lumpur in Selangor, and from the hills near Taiping in Perak, which latter were secured in conjunction with Mr. C. B. Kloss.

By the enlightened generosity of the authorities of the Federated Malay States a full set of these specimens, numbering nearly 600 skins, has been presented to the National Museum, in order that the result of so important an expedition should be of benefit to science in general as well as to the local institutions.

The Rhio Archipelago has been hitherto entirely unrepresented either in our own Museum, or, so far as we know, in any other, except the United States National Museum, which possesses the series obtained by Dr. W. L. Abbott during his various visits to the islands and some smaller collections from Mr. Kloss. On these latter have been based the only papers published on the Rhio Mammals—viz.,

Miller, G. S.: "The Mammals collected by Dr. W. L. Abbott in the Rhio-Linga Archipelago." *P. U. S. Nat. Mus.*, xxxi., pp. 247-286, 1906. With map:

Lyon, M. W.: "Mammals of Batam Island, Rhio Archipelago." *Tom. cit.*, pp. 653-657.

The present collection, therefore, is of the most material importance, both in filling up such a considerable hiatus in our collections and in enabling us to appraise the value of the many species described by the American naturalists referred to. In addition, we have found occasion to describe from the collections 10 additional species and sub-species, some from the islands and some from the adjoining mainland. Of these new forms, we have given preliminary diagnoses in the "*Annals and Magazine of Natural History*" for May, 1909.

With regard to the "species" founded by Messrs. Miller and Lyon, we can only reiterate our opinion that the majority of them should have been called sub-species rather than species. Their differences are, for the most part, average differences, based on series, the series overlapping in the characters used, and therefore, even though insular in locality, trinomials, and not binomials, might well have been used for them as indicating the nearness and more or less inconstant nature of their relationship to older known forms.

In conclusion, we would express our appreciation of the public spirit and sympathy for science shown by the authorities of the Federated Malay States, who have permitted the party the use of a specially-chartered vessel for these explorations, and have therefore helped materially in carrying out this extensive collecting trip. Of these authorities the names of Sir John Anderson, G.C.M.G., Governor of the Straits Settlements, and High Commissioner for the Federated Malay States; Sir William T. Taylor, K.C.M.G., Resident-General, Federated Malay States; and H. C. Belfield, Esq., C.M.G., Resident of Selangor, who was officiating as Resident-General at the time the Rhio expedition was projected and carried out, should be specially mentioned. Thanks are also due to H.H. the Sultan of Johore for facilities afforded in his territories and to Mr. H. Spakler, Consul-General for the Netherlands, for providing introductions which were of much assistance in islands under the Dutch Flag.

[The whole of the collections reported on in the present article, with the exception of those from Selangor and Perak, were made during a cruise, which lasted from the commencement of June, 1908, to the 4th September, 1908. The vessel used was a large Chinese tongkang, or sailing lighter, of about 70 tons measurement, which had formerly been used for conveying granite from the quarries of Pulo Ubin in Johore Straits to Singapore. She measured about 70 feet in length by 16 feet beam and drew when running light, as we used her, about 5 feet. She was ketch rigged and carried a crew of four Hokkien Chinamen and on a good breeze we could get six or seven knots out of her, though, with the light airs prevalent at the season, our progress was usually very slow and we took six days returning from Pulo Tinggi to Singapore Straits, a distance we had covered on the northward journey in 18 hours.

Our party consisted, for the greater portion of the trip, of two Europeans, four Dyak collectors and a couple of Malay servants, but Karimon and Kundur were not visited by Robinson, who had to return to Kuala Lumpur. We lived on board the tongkang, in which a comfortable and commodious cabin had been built amidships, collected from dawn until about 9 a.m. and again from 4 p.m. until dusk, the intervening time being spent in skinning. We secured in all rather over a thousand mammal skins and about two hundred birds. The latter, however, are of no particular interest and only include one rarity, the pigeon *Columba grisea*, G. B. Gr., which was shot on

Karimon. It had previously been obtained by Messrs. Abbott and Kloss on Pulo Taya, south-east of Lingga Island, and in the chain of islands, off the west coast of Sumatra, and is common on some of the islets, near the Sarawak coast, but, until recently as one of the rarest species of its group, the British Museum only possessing one antiquated specimen.

The collections described by Messrs. Thomas and Wroughton in the following pages were obtained in numerous localities, which may be conveniently grouped in five main divisions, regarding which it may be of interest to give some account.

From the north, southwards, these divisions are :

- (I.) The Larut Hills, immediately above Taiping, the capital of Perak :

Specimens are listed from two localities in this range—viz.,

- (a) "Maxwell's Hill," a clearing of about a hundred acres in extent, at an average altitude of about 3,600 feet and surrounded by heavy jungle ;
- (b) Gunong Ijau, the culminating summit of the Larut Range, about 3 miles from Maxwell's Hill and about 4,700 feet high.

From these localities two species of rats, hitherto known only from the type localities, were secured—viz., *Mus ferreocanus*, known only from Dr. Abbott's three skins from Trang, and *Mus bukit*, which was described from Bukit Besar in the Patani States—and also the type of *Rhinosciurus peracer*, Thos. and Wrought.

- (II.) Selangor :

Five localities in this State are mentioned—viz.,

- (a) Dusun Tua, about 17 miles from Kuala Lumpur, the capital of the State, near some thermal springs in the vicinity of orchards and rice fields, though there is still much old jungle left ;
- (b) Cheras, half-way between Dusun Tua and Kuala Lumpur, close to a big block of old jungle ;
- (c) "Klang Gates," about 9 miles from Kuala Lumpur, beneath a range of precipitous limestone hills, of no great elevation, covered with primary jungle. The spiny rats were found to be very common here, especially the obscure form, *Mus pellax*, which had hitherto escaped our notice. *Mus Klossii*, or what we thought was a form of *Mus asper*, Miller, was also very numerous ;

- (d) Gunong Mengkuang Lebah—

A mountain on the main range of the Peninsula between Selangor and Pahang, attaining a height of about 5,800 feet. Only small series of mammals have been

collected on this hill, but it is known to possess, in common with other ranges of similar elevation, species that are not met with in the low country, such as *Mus ciliatus*, Bonh.; *Sciurus tenuis tahan*, Bonh.; *Sc. novemlineatus*, Miller; and *Demomys rufigenis belfeldi* (Bonh.);

(e) Semangko Pass, 2,700 feet—

A pass on the main range between Selangor and Pahang, to the north of the preceding locality with high hills, on either side of it reaching about 4,800 feet.

(III.) Singapore and S. Johore :

(a) Bukit Timah, 580 feet—

In the centre of Singapore Island and the highest hill on it. Being a forest reserve, there is still some old jungle left, though it is very much damaged, most of the really large trees having been cut out. The hill, or its immediate neighbourhood, is probably the actual type locality for such species as *Sciurus tenuis*, *Tupaia ferruginea* and *Tragulus kanchil fulvirenter*;

(b) Changi, Singapore Island—

A locality at the north-east corner of the island at the eastern entrance to Johore Straits, where there is still 300 or 400 acres of old jungle, and where mammals, especially rats and shrews, were found to be numerous;

(c) Tanjong Surat, S.-E. Johore -

On the coast of Johore, a few miles N.N.-E. of Changi. A large village with considerable groves of coconuts. There is no old jungle in the neighbourhood, all having been felled for gambier and pine-apples. Most of the plantations are now abandoned and have grown up in coarse grass (lalang) and bracken (resam);

(d) Si Karang, S.-E. Johore—

On the coast, 4 or 5 miles east of Tanjong Surat at the foot of the hill marked on the charts as Little Johore Hill. There was a certain amount of jungle here and characteristic species, such as *Mus vociferans* and *Rhinosciurus leo* were obtained;

(e) Tanjong Boi, S.-E. Johore—

A promontory between the estuaries of the Johore and Lebam Rivers and opposite Tanjong Surat.

A grove of coconuts yielded specimens of *Sc. peninsularis*, and not the new form *luteolus*, which occurs at Tanjong Surat and Si Karang, and also a few common rats;

(f) Bentan and Tanjong Penang—

Places on the south bank of the Lebam estuary, at each of which we had one night's trapping, securing specimens of *Mus klossi* and *Mus villosus*. The whole of the district has been devastated by pine-apple growers and no old jungle could be reached;

(g) Tanjong Gomok, S. Johore—

West of Pulo Ubin, on the north bank of the Johore Straits. This locality is only of interest on account of the presence of *Sc. v. miniatus*.

(IV.) E. Johore :

(a) Lemau Point --

A small rocky knoll, projecting from an extensive sandy beach, which is fringed with a narrow grove of casuarinas and backed with a swamp so thorny as to be almost impenetrable. The locality, of which we had great hopes, proved most disappointing and yielded nothing but squirrels and a few rats. Game, however, was abundant, and the fresh tracks of deer and tiger were much in evidence during the three or four days we remained at anchor off the point. The village hard by had been deserted owing to the ravages of bears;

(b) Sibau Island--

An island about 4 miles long and 500 feet high, about 4 miles off the shore opposite Lemau Point: the intermediate depth being under 10 fathoms. We spent one night here and secured a series of *Mus rattus*, which, we were told, was the only mammal on the island;

(c) Tinggi Island—

A lofty island, 5 miles by $2\frac{1}{2}$, and about 2,000 feet high, 7 or 8 miles north-east of Sibau Island, and just inside the 15-fathom line. It is inhabited by a few "orang laut" of mixed Jakun and Malay origin, and has several large coconut groves on it. With the exception of a few hours spent on it by one of us in 1906, it had never been collected on and it was hoped might yield species as interesting as its neighbours Tioman and Aor. Such was not the case, however, and the collections were most uninteresting, consisting merely of *Macaca fascicularis*, a squirrel of *peninsularis* type; *Mus concolor*; and a *Cynopterus*, which is probably *C. montanoi*.

A mouse deer is said to exist, but it is very rare, and the existence of any other species is denied by the natives. Even the plantain squirrel was exceedingly scarce.

Duyong (*Halicore duyong*) were not uncommon in some of the bays; but though two specimens were shot, they sank at once and were not recovered.

(V.) The Rhio Archipelago:

(a) Bintang Island—

With the exception of the outlying island of Panjang, or Mapor, which we were unable to visit, owing to unfavourable winds and currents, Bintang is the most easterly, as it is also the largest, island in the group. It is nowhere high, the biggest hill, Bukit Bintang, which forms an important mark for vessels entering Singapore Straits from the east and north only reaching 1,200 feet. The greatest part of its area consists of undulating land, from which all the jungle has been cleared in years past—for pepper, gambier and pine-apples - and has now, for the most part, relapsed into secondary growth, which is very difficult to penetrate. In places the ground is swampy and portions of the coast are fringed by mangroves, which, however, nowhere form a very broad belt, except on parts of the south coast, which we did not visit. On the north and east the shore is, for the most part, rocky with occasional beaches of fine white sand, and is nearly everywhere fringed by coral reefs. We collected at three places—viz., Tanjong Tombak, Pasir Panjang and Sungei Biru—all on the north coast, and the latter close to Tanjong Berakit, the north-east extremity of the island, and also visited for an hour or two Telok Dalam, a small settlement on the east coast:

(b) Batam Island —

Batam is the second largest island of the Rhio Archipelago and lies west of Bintang, from which it is separated by the Rhio Straits which form the highway for vessels proceeding from Singapore to Java and the Sunda Straits. It is even more cleared than Bintang, and those districts visited by us possessed very little original jungle indeed. The collections made by Kloss and reported on by Dr. Lyon were secured on the north and west coasts, while the present ones were made on the east at two localities within a few miles of each other—viz., Tanjong Sauh and Tanjong Turut. A full account of the island is given by one of us in the "Journal of the Straits Branch of the Royal Asiatic Society;" *

* No. 49, pp. 61-71 (1906).

(c) Sauh Island—

A small island in Rhio Straits between Batam and Bintang, the site of a light-house, maintained by the Dutch Government. Pigs of two species are found on it, mouse deer and the three species of rats, but no squirrels or shrews ;

(d) Karimon Island—

This island is the most outlying of the Archipelago, and the most conspicuous of the northern group, owing to its height and position in the mouth of the Straits of Malacca near Singapore. Its peak, which is said to be an extinct volcano, rises to nearly 2,000 feet. Most of the timber has been cut out for export to the Singapore market and very little remains except at the northern end.

Four localities were collected in—viz., Monos at the northern end at the entrance of the Straits between Karimon and Little Karimon, Sebatak on the east coast, Tanjung Balai and Pernal on the south. The whole of the south end of the island is covered with lalang grass and scrub ;

(e) Little Karimon—

A small island to the north of Karimon, about 500 feet high. The only jungle left is on the tops of the hills, but large groves of coconuts, areca palms and durians exist. The island is only inhabited during the fruit season ;

(f) Merah Island—

About a square mile in extent, a mile from the south coast of Karimon. The only animal secured was “*Mus rattus* ;”

(g) Tulang Island—

A large low island, only separated by a narrow creek from Kundur. The expedition only stopped one night here on the way from Kundur. A form of *Ratufa insignis* was shot and a few “*Mus rattus*” trapped ;

(h) Kundur Island—

A large low island, separated by a 10-fathom channel from Karimon but by much shallower water from Sumatra. Only a small patch, a few acres in extent, is left of the original jungle at the north end of the island, which was the only portion visited. Giant squirrels were fairly common, and the large white pig, *Sus oi*, was said to be very common, as was also the smaller *Sus rhionis*.]

1. *PRESBYTIS ALBOCINEREA*, DRAK.

♂ 1468/08. Dusun Tua, Selangor.

♀ 1470/08. Gunong Mengkuang Lebah, Selangor, 5,200 feet.

[Apparently unknown south of Selangor, where it is the commonest monkey in the inland districts.—H. C. R. and C. B. K.]

2. *PRESBYTIS ALBOCINEREA CANA*, MILL.

♂ 1434, 1451; ♀ 1452, 1501. Bliah, Kundur Island, Rhio Archipelago.

Topotypes.

[This form and the next inhabit the high woods and are not seen at river mouths nor in the mangroves.—H. C. R. and C. B. K.]

3. *PRESBYTIS ALBOCINEREA RHIONIS*, MILL.

♂ 811; ♀ 786. Sungai Biru, Bintang Island, Rhio Archipelago.

Topotypes.

4. *PRESBYTIS CRISTATA*, RAFFLES.

♂ 1515/08; ♀ 1510/08. Kuala Selangor, Selangor.

[Common in the coastal mangrove zone from Province Wellesley to Kuala Klang in Selangor, but unknown in Singapore or in any part of Johore.—H. C. R. and C. B. K.]

5. *PRESBYTIS CRISTATA PULLATA*.

Thos. and Wrought., Ann. Mag. N. H. (8), iii., p. 439 (1909).

♂ 760; ♀ 762. Pasir Panjang, Bintang Island, Rhio Archipelago.

♂ 921; ♀ 868, 869, 903, 904, 905, 906, 926. Tanjong Saah and Tanjong Turut, Batam Island, Rhio Archipelago.

A local race of *Presbytis cristata*, differing by its darker colouring, especially on forehead and forearms and smaller teeth.

General colour as in *P. cristata* but duller, bases of hairs true black and pale tips quite short; whereas in true *cristata* the bases are slate colour, merging into silvery white for the terminal fourth of the hair length. Black cap more marked than in *cristata* and extending further back on to the nape; forearms much less grizzled with white, very often entirely black.

Skull as in *cristata*, except that the upper tooth row is rather shorter.

MEASUREMENTS OF THE TYPE:

Head and body, 430; tail, 603; hind foot, 154; ear, 30 mm.

Skull: greatest length, 90.5; basal length, 65; palatal length, 32; greatest breadth, 69; braincase breadth, 50.5; nasal opening, 14.3 × 6.6; upper cheek tooth series, 26.3; maxillary tooth row, exclusive of incisors, 30 mm.

HABITAT.—Batam and Bintang Islands, Rhio Archipelago (type from Tanjong Turut, Batam Islands).

TYPE.—Adult female. B. M. No. 9, 4, 1, 9. Original number 906. Collected 12th July, 1908.

[This Leaf Monkey, which is called "lotong itam," "lotong klabu," or merely "klabu," by the local Malays, is excessively common on both Batam and Bintang; though, curiously enough, Seimund did not meet with it on either Karimon or Kundur. As it was also unrepresented in Dr. Abbott's collections, it presumably does not occur on these islands. It is found usually in the mangroves in the immediate neighbourhood of the sea or tidal creeks, and hardly ever in high jungle.]

It keeps in small parties of six or seven individuals made up of one old male with females and young of different ages. The newly born are brilliant orange yellow, but the pelage appears to be changed rapidly as specimens less than half grown are almost identical in colouration with the adults.—H. C. R. and C. B. K.]

6. *MACACA FASCICULARIS*, RAFFLES.

♂ 1065. Singapore Island.

♂ 849; ♀ 844. Tinggi Island, East Coast of Johore.

♂ 812; ♀ 740, 746, 780, 784. Bintang Island, Rhio Archipelago.

♂ 892, 893; ♀ 870, 877. Batam Island, Rhio Archipelago.

♂ 1329, 1331, 1332, 1662; ♀ 1330, 1636. Karimon Island, Rhio Archipelago.

♂ 1454; ♀ 1495. Kundur Island, Rhio Archipelago.

[The "kra" was very common indeed on every island we visited, including Singapore; females and young specimens were very tame and inquisitive, and consequently easy to collect, but the old males were very wary and took a good deal of getting. On Karimon they caused a great deal of trouble by springing or running off with the traps; as a result, a good many more than were really required came to an untimely end. The Peninsular form of this macaque is very variable, but it is not improbable that the smaller, brighter race inhabiting the more inland districts may be subspecifically distinct.—H. C. R. and C. B. K.]

7. *PTEROPUS VAMPIRUS MALACCENSIS*, K. AND.

♂ 773; ♀ 759. Pasir Panjang, Bintang Island, Rhio Archipelago.

♂ 878, 976; ♀ 977. Tanjung Turut, Batam Island, Rhio Archipelago.

♂ 866, 867. Tanjung Suuh, Batam Island, Rhio Archipelago.

[The Malay Flying Fox, or "kluang," is essentially a denizen of the mangroves which fringe both shores of the Straits of Malacca, and although it may penetrate for considerable distances inland when certain fruits are in season, it is never seen in the countless millions that are a common sight in the narrow channels that intersect the islands in the neighbourhood of the Klang Straits on the coast of Selangor. In the Rhio Archipelago it was common on every island visited, though nowhere seen in very large flocks.—H. C. R. and C. B. K.]

8. *CYNOPTERUS MONTANOI*, ROB.

♂ 1271. Si Karang, S.-E. Johore.

♀ 1178, 1175. Tanjong Surat, S.-E. Johore.

♂ 895, 896, 940, 941, 957; ♀ 942, 970, 971, 972, 973, 974. Tanjong Turut, Batam Island, Rhio Archipelago.

♂. Pernal, Karimon Island, Rhio Archipelago.

[Very common nearly everywhere in the southern half of the Peninsula and the islands, hanging in bunches under the eaves of the houses and on the fronds of the coconut palms. Replaced by the somewhat dubious species, *C. angulatus*, Mill., in the more northern districts, though how far south this form extends is as yet uncertain.—H. C. R. and C. B. K.]

9. *CYNOPTERUS* (NIADIUS) *HARPAX*.

Thos. and Wrought., Ann. Mag. N. H. (8), iii., p. 439 (1909).

♂ 695/08. Semangko Pass, Selangor-Pahang boundary, 3,000 feet.
571.

30th January, 1908.

B. M. No. 87, 20, 7. Type.

Size as in the Sumatran *C. (N.) minor*,* but teeth less square.

Size about as in *C. minor*, or a little smaller, the present specimen being old and the type of *minor* slightly immature. Colour quite as in typical *Cynopterus*, the back olivaceous brown with light bases to the hairs; sides of neck, throat and sides of belly brilliant ochraceous, median area of belly grey. Ears of medium size, margined with white, an angular lobule at the base of the external border.

Skull of about the size of that of *C. minor*, except that the interorbital region, is narrower and the tooth row shorter. Owing, however, to the imperfection of the typical skull, I am not able to make a complete comparison with the measurements given by Dr. Lyon. In general form the skull is quite similar to that of the much larger *C. (N.) princeps*, with the same grooved interorbital region with swollen margins and the same well-marked ridges.

Teeth of the same essential structure as in the other two forms of *Niadius*, with the same definite central cusp on p_1 and m_1 , but the teeth throughout are narrower, less squared, and the lower ones are narrower posteriorly than anteriorly, the converse being the case (at least for p_3 and p_4) in *C. princeps*, with whose teeth those of *C. minor* are said to agree in every detail. The second minute central cusp of m_1 of *C. princeps* is, however, not represented in the new form.

DIMENSIONS OF THE TYPE (the starred measurements taken in the flesh):

Forearm, 72 mm.; head and body, 105; * tail, 7; * hind foot, 15; * ear, 21.* Third finger metacarpal, 48; first phalanx, 31; second phalanx, 40.

Skull: tip of nasals to supraorbital foramen, 13.7; zygomatic breadth, 22.5; least interorbital breadth, 5.6; front of canine to back

* Lyon, P. U. S. Nat. Mus., xxxiv., p. 665 (1906).

of m^1 (alveoli), 10.5; last lower premolar, length, 2.3; breadth anteriorly, 1.9, breadth posteriorly, 1.6.

HABITAT and TYPE as above. Should any mistake have been made in the allocation of skull to skin, which the close resemblance of the skin to ordinary *Cynopterus* suggests but which we have no other reason to suspect, the skull is to be taken as the type.

This most interesting species represents an intermediate link between *Cynopterus* and Mr. Miller's genus *Niadius*, possessing the extra-central molar cusps of the latter and the narrower and posteriorly-tapered teeth of the former. On this account, and also as we find that true *Cynopterus* has occasionally a small extra cusp on m_1 ,* we are not prepared to recognise *Niadius* as more than a sub-genus of *Cynopterus* even if it should not be altogether combined with the latter.

With regard to the specific distinctness of *C. harpax* from *C. minor* with which it agrees so closely in size, Dr. Lyon's statement that *minor* has the square-shaped teeth of *C. princeps* is so definite that in the case of such an accurate observer no doubt can exist as to the difference between the two forms.

[No doubt need be felt as to the allocation of skin to skull in the case of this specimen; there are four more of the species in the Selangor Museum collection, all shot in the same place and on the same day as the type described above. Unfortunately, the skulls of two are destroyed, and the others much damaged; but sufficient material remains to corroborate the cranial and skin characters given by the authors. It is unusual to meet with specimens of *Cynopterus* in deep jungle or at such an altitude as the Semangko Pass.—H. C. R. and C. B. K.]

10. PTENOCHIRUS LUCASI, DOBS.

♂ 1733, 1734; ♀ 1735. Bukit Timah, Singapore Island (H. N. Ridley).

♂ 706; ♀ 709, 712, 718. Tanjong Tombak, Bintang Island, Rhio Archipelago.

Mr. Ridley was the first to discover this bat out of Borneo, having sent specimens from Singapore to the British Museum in 1894.

The teeth of *Pt. lucasi* are rather variable in size, some of the specimens having much broader teeth than others. The same range of variation in this respect occurs both in Bornean and Peninsular specimens. The teeth of the males are generally larger than those of the females, but there seem to be some exceptions to this rule.

[This Fruit Bat is an inhabitant of caves and crannies, but is very local in the Peninsula, being only known from the above locality in Singapore and from the Batu Caves near Kuala Lumpur, where it is one of the rarer species.—H. C. R. and C. B. K.]

11. HIPPOSIDEROS GALEBITUS, CANT.

♂ 1639, 1642; ♀ 1638. Monos, Karimon Island, Rhio Archipelago.

* B. M. No. 97, 11, 4, 1, from Bombay.

12. MEGADERMA SPASMA TRIFOLIUM, GEOFF

♂. Tanjong Tombak, Bintang Island, Rhio Archipelago.

[Outside caves this is the commonest of the Leaf-nosed Bats in the Peninsula.—H. C. R. and C. B. K.]

13. NYCTALUS STENOPTERUS, DOBS.

♀ 1283. Si Karang, S.-E. Johore.

[Occurs also in Singapore and not hitherto recorded from the Peninsular region.—H. C. R. and C. B. K.]

14. SCOTOPHILUS CASTANEUS, GRAY.

♂ 1221, 1222; ♀ 1226, 1227, 1229, 1232. Tanjong Surat, S.-E. Johore.

[Generally found in large numbers in the crowns of pinang and coconut palms, or in houses.—H. C. R. and C. B. K.]

15. MYOTIS ADVERSUS (HORSE.) (†).

1579, 1581. Lekop, Karimon Island, Rhio Archipelago.

16. EMBALLONURA PENINSULARIS, MILL.

♂ 1432, 1461, 1484. Bliab, Kundur Island, Rhio Archipelago.

Pending a general revision of the group, we use Mr. Miller's name for this bat on account of its locality. But we have already shown * that his main reason for distinguishing it from the Javan *monticola*, its supposed greater size, was non-existent, and we now fail to find any striking difference between the skulls of these specimens and those collected by Mr. Shortridge in Java.

[Since this bat was first recorded from Trang it has turned up in considerable numbers in various local collections. It is a jungle species flying in dense shade throughout the day and appearing in open spaces at dusk.—H. C. R. and C. B. K.]

17. TAPHOZOUS LONGIMANUS ALBIPINNIS, THOS.

♀ 1218. Tanjong Surat, S.-E. Johore.

[Found associated with large numbers of *Scotophilus castaneus*. Lives in hollow trees and among rocks.—H. C. R. and C. B. K.]

18. CHIROMELES TORQUATUS, HORSE.

♂ 1444, 1455. Bliab, Kundur Island, Rhio Archipelago.

[Very common in Singapore, in the Rhio Archipelago and in Tioman Island, but decidedly rarer on the mainland. It is not an easy species to obtain, as it flies with extreme swiftness, justifying its generic name, and only appears when it is almost dark. Several were shot from the deck of the tongkang but sank at once.—H. C. R. and C. B. K.]

19. GALEOPTERUS PENINSULÆ, THOS.

♂ 1120; ♀ 1089. Changi, Singapore Island.

[Quite common in those portions of Singapore Island, still under forest, the Flying Lemur, or "kubong," occurs abundantly on all the

* P. Z. S., 1909, p. 38.

islands round the Peninsula, but apparently more sparingly on the mainland itself. It inhabits dense jungle, where it passes the day with its body closely flattened against the trunks of trees with its head upwards, not hanging from branches like bats. It is probably crepuscular, but we have never seen it flying on its own initiative like the large flying squirrels of the genus *Pteromys*.

The lemon yellow tinge often observed on the pelage appears to be due to some extraneous matter as it partially disappears during the preparation of the specimen. Though commonly classed as an insectivore, the species is largely a vegetable feeder as the stomachs of the numerous individuals examined by us rarely contained any appreciable amount of animal matter, but were almost wholly filled with masticated leaves and buds.—H. C. R. and C. B. K.]

20. GALEOPTERUS AORIS, MILL.

- ♂ 752, 772; ♀ 751. Pasir Panjang, Bintang Island, Rhio Archipelago.
 ♂ 789, 795; ♀ 813, 814. Sungei Biru, Bintang Island, Rhio Archipelago.
 ♂ 1560, 1561; ♀ 1559. Lekop, Karimon Island, Rhio Archipelago.
 ♀ 1635. Monos, Karimon Island, Rhio Archipelago.

We find that the Flying Lemurs, inhabiting the Rhio Archipelago, Aor Island, the Natunas and Borneo, agree in being of medium size, with very small teeth in marked contrast to the large teeth of *peninsula*. But among themselves we have failed to find any constant local differences warranting their division into races, and have therefore adopted *aoris* as the oldest name for them.

[Very common on all the islands.—H. C. R. and C. B. K.]

21. TUPAIA CASTANEA, MILL.

- ♂ 782, 792, 806; ♀ 791. Sungei Biru, Bintang Island, Rhio Archipelago.
 ♂ 749, 750; ♀ 742, 768. Pasir Panjang, Bintang Island, Rhio Archipelago.

Topotypes.

[This shrew is remarkably distinct from any form inhabiting the Peninsula or adjacent islands, though a closely-allied race has recently been described from Sumatra. It was very abundant on Bintang in secondary jungle which had grown up on the sites of old gambier plantations. The pelage of very young specimens is different from that of the adult and approaches *T. ferruginea*.—H. C. R. and C. B. K.]

22. TUPAIA FERRUGINEA, RAFFLES.

- ♂ 1011, 1085, 1054, 1101, 1128; ♀ 1007, 1099, 1129. Changi, Singapore Island.
 ♂ 1263; ♀ 1251. Si Karang, S.-E. Johore.

[The jungle near Changi was an exceedingly good trapping ground, and out of 70 or 80 traps set every night, hardly one was found unsprung, or without an occupant next morning. Six or seven of these shrews were usually thus captured and many more were shot every day. The popular name of "tree shrew" for these animals is hardly descriptive of their habits, as, in the case of the majority

of species, at any rate, it is quite exceptional to see one anywhere than on the ground, among the roots of trees or on low bushes. The diet is very mixed, consisting of ants and other insects, fruits, seeds and buds. The nest is found in holes, often in fallen timber, and two young are produced at a birth.—H. C. R. and C. B. K.]

23. *TUPAIA FERRUGINEA BATAMANA*, LYON.

♂ 881, 956, 966, 967; ♀ 900, 918, 965. Tanjong Turut, Batam Island, Rhio Archipelago.

Topotypes.

[As common in Batam Island as the typical form is in Singapore.—H. C. R. and C. B. K.]

24. *ARCTOGALIDIA FUSCA*, MILL.

♀ 1525, 1526. Bliah, Kundur Island, Rhio Archipelago.

Topotypes.

25. *ARCTOGALIDIA SIMPLEX*, MILL.

♂ 939; ♀ 938. Tanjong Turut, Batam Island, Rhio Archipelago.

[Species of this genus, to which the name of palm-civet far more properly applies than to the commoner *Paradoxurus*, are apparently by no means rare in the Rhio Archipelago. It is evidently far more diurnal than the ordinary musang and less carnivorous in its diet. It was numerous among the coconuts, fringing the east coast of Batam, and several were shot at dusk, though an individual has also been shot at midday while feeding in shady forests.

On the Peninsula itself the genus is rare and none of the local Museums possess an adult specimen, and neither of us have during many years seen a specimen in the flesh.—H. C. R. and C. B. K.]

26. *AONYX CINEREUS*, ILL.

♂ 770. Pasir Panjang, Bintang Island, Rhio Archipelago.

[Common among the mangroves on the shore.

Quite the most abundant of the otters of the Malay Peninsula and found equally in salt, brackish and fresh water, and even in mountain streams.—H. C. R. and C. B. K.]

27. *RATUFA AFFINIS*, RAFFLES.

♂ 1041. Changi, Singapore Island.

Topotype.

[Now getting rather scarce in Singapore, though common in S. Johore. Its extension northwards is very limited, and we do not know of any specimen obtained in the interior of the State. In Malacca and Negri Sembilan its place seems to be taken by the form to which the name of *Ratufa affinis aureiventer*, Geoff., has been applied by Bonhote. Further north on the west side of the mountains the dark-footed species *R. pyronota*, Mill., begins to appear. The black and yellow species *R. melanocephala*, Mill., occurs throughout the Peninsula except in the districts inhabited by *R. affinis*. It is not known from Singapore.—H. C. R. and C. B. K.]

28. RATUFA INSIGNIS, MILL.

♂ 894; ♀ 879. Tanjong Turut, Batam Island, Rhio Archipelago.

♂ 1532; ♀ 1533. Talang Island, Rhio Archipelago.

A comparison of the fine series of Rhio Giant Squirrels obtained by this expedition brings us to the conclusion that they ought all to be considered as one species, and that even as sub-species, the characters used by Mr. Miller to separate the different island forms, are so intangible and so inconstant that their recognition is only doubtfully advisable. For the moment we place the specimens that are topotypes under their respective island names, leaving those from Batam and Talang simply as *R. insignis*.

That the different island forms overlap in their characters is a fact beyond dispute, as these specimens clearly show, and we are more than ever convinced, that the use of binomials for such forms is a very great mistake.

[Apparently scarce on Batam, as the two specimens listed above were the only ones seen by a party of six in over a fortnight, while Kloss never met with it on two visits. Seimund reports it as common on Talang.

All the Giant Squirrels are inhabitants of high jungles except in the fruit season when they occasionally visit orchards. They keep to the tops of lofty trees, are solitary in their habits, and, when alarmed, give utterance to a loud chattering, which is sometimes heard in the jungle at night. The very special liability of members of this genus to rapid and extensive bleaching causes great difficulty in the recognition of the very numerous geographical races into which the original *R. ephippium* has now been split up.—H. C. R. and C. B. K.]

29. RATUFA INSIGNIS KARIMONENSIS, MILL.

♂ 1544, 1551, 1553; ♀ 147, 1550, 1552, 1555, 1556. Sebatak, Karimon Island, Rhio Archipelago.

♂ 1634. Monos, Karimon Island, Rhio Archipelago.

♀ 1372. Pernal, Karimon Island, Rhio Archipelago.

Topotypes.

[Very common.—E. S.]

30. RATUFA INSIGNIS CONDI'RENSIS, MILL.

♂ 1493; ♀ 1470, 1472. Bliab, Kundur Island, Rhio Archipelago.

Topotypes.

[Common.—E. S.]

31. RATUFA INSIGNIS CONSPICUA, MILL.

♂ 790, 809; ♀ 807, 810. Sungei Biru, Bintang Island, Rhio Archipelago.

Topotypes.

[This species was common only in a patch of high jungle at the extreme north-east end of Bintang Island and was rather difficult to get, as it kept to the extreme tops of very lofty trees.—H. C. R. and C. B. K.]

32. *SCIURUS PREVOSTII CONDURENSIS*, MILL.

♂ 1437, 1445, 1446, 1469, 1492; ♀ 1438, 1439, 1440, 1442, 1450, 1468.
Bliah, Kundur Island, Rhio Archipelago.

Topotypes.

[Very common. It is a curious fact that in the Rhio Islands, where squirrels of this group are met with, no form of *vittatus* occurs and *vice versa*. All the specimens from the Archipelago were obtained in the vicinity of villages, but in the Peninsula they are strictly jungle animals and are quite unknown in orchards.—H. C. R. and C. B. K.]

33. *SCIURUS PREVOSTII CARIMONENSIS*, MILL.

♂ 1341, 1355, 1367, 1387, 1388; ♀ 1328, 1368, 1371, 1389, 1403.
Pemeral, Karimon Island, Rhio Archipelago.

Topotypes.

34. *SCIURUS VITTATUS MINIATUS*, MILL.

♀ 1307, 1309. Tanjong Gomok, S. Johore.

[The occurrence of five specimens of this race at the extreme south of the Peninsula is a most disconcerting fact, as we were formerly of the opinion that the true *miniatus* was found only in connection with the main range and did not extend further south at most than the latitude of Malacca, while the remaining non-mountainous southern portion of the Peninsula (*i.e.*, the region south of the Pahang, Triang and Muar rivers) seemed to be occupied by the paler animals of the following races, with no clear red pencil to the tail. It seems at present an undoubted fact that these specimens of *miniatus* from Tanjong Gomok are isolated from the rest of their race by the southern forms, and that we have here a minor instance of discontinuous distribution.—H. C. R. and C. B. K.]

35. *SCIURUS VITTATUS PENINSULARIS*, MILL.

♂ 833. Leman Point, E. Johore.

♂ 1215, 1216. Tanjong Boi, S.-E. Johore.

♀ 860. Bukit Timah, Singapore Island.

♂ 1039, 1113; ♀ 1013, 1032, 1133. Changi, Singapore Island.

♂ 1687, 1688; ♀ 1666, 1689, 1711. Little Karimon Island, Rhio Archipelago.

♂ 766; ♀ 732, 743, 769. Pasir Panjang, Bintang Island, Rhio Archipelago.

♂ 702, 704, 710. Tanjong Tombak, Bintang Island, Rhio Archipelago.

♀ 825. Telok Dalam, Bintang Island, Rhio Archipelago.

♀ 794. Sungai Biru, Bintang Island, Rhio Archipelago.

Some of the Bintang specimens have a broader black lateral stripe than usual, but the character is not constant enough to justify their separation as a local race.

In working out these Plantain Squirrels the question has again arisen as to what is the typical *Sc. vittatus*, Raffles., a question which has given a great deal of trouble to recent workers, owing to the fact that the four specimens in the British Museum received from Raffles and considered as typical of his species are obviously referable to more than one form.

We now owe to the kindness of the authorities of the United States National Museum six specimens of the group, representing different forms described and recognised by Messrs. Miller and Lyon in their various writings on the subject, and have carefully compared Raffles' specimens with these in order to settle, pending the arrival of Bencoolen topotypes, what form should be considered to be the true *Sciurus vittatus*.

Of the four "typical" specimens, No. 79, 11, 21, 580, has a red tail tip, and is clearly referable to *S. v. miniatus*, Miller, a native of the northern part of the Malay Peninsula. No such form has been found in Sumatra, and since Raffles undoubtedly received many specimens from places in the Peninsula, we may consider this specimen as one of them, and eliminate it as being not typical of the Bencoolen *vittatus*.

A second specimen, No. 79, 11, 21, 581, has lost the tip of its tail, but the stump shows a little red, and this also may, therefore, be eliminated as possibly Malayan in its origin and put aside from the question.

The above two specimens are referred to in Horsfield's "Catalogue of the Indian Museum"* as having been presented by Sir T. S. Raffles, but no locality is assigned to them.

The other two specimens, 69*a* and 69*b*, were presented by Lady Raffles in 1830, and of them 69*a* with a broken tail and characters that we cannot match exactly in any Sumatran specimen may be put aside, thus leaving 69*b* to stand as the type.

This specimen agrees precisely with the two from localities nearest to Bencoolen now available to us—namely, one from Pajo in the Padang Highlands, collected by Carl Bock; and the other from Tarussan Bay, collected by Dr. Abbott—and typical of Mr. Lyon's *Sc. v. tarussanus*,† a name that will, therefore, become a synonym of *Sc. v. vittatus*.

This result is not unexpected, and there is little prospect of its being upset on the arrival of undoubted Bencoolen specimens of *Sc. vittatus*.

We, therefore, take the name *vittatus* for the Plantain Squirrel of the southern half of Western Sumatra, leaving *peninsularis* for those of the Peninsula and Eastern Sumatra, with the majority of the islands between the two. That from Batam, however, may be distinguished as a special local form.

33. SCIURUS VITTATUS NESIOTES.

Thos. and Wrought., Ann. Mag. N. H. (8), iii., p. 439 (1909).

♂ 884, 898, 912, 914, 920, 923, 969; ♀ 908, 909, 911, 935. Tanjong Turut, Batam Island, Rhio Archipelago.

♂ 873; ♀ 871, 874, 875. Tanjong Sauh, Batam Island, Rhio Archipelago.

A local race of *Sc. vittatus*, most resembling sub-sp. *peninsularis*, but with the dark lateral band reduced.

* P. 152 (1851).

† Smiths. Misc. Coll., xlviii, p. 279 (1907).

General colour above rather greyer than in *peninsularis*; arms, hands, legs and feet as in true *vittatus* and lacking the bright golden grizzling of *peninsularis*. Lower surface "tawny ochraceous," black side stripe narrow in marked contrast to its strong development in the specimens of the *vittatus* group in the other islands of the Archipelago.

Skull as in typical *vittatus*.

DIMENSIONS OF THE TYPE:

Head and body, 202; tail, 173; hind foot, 45; ear, 16 mm.

Skull: greatest length, 51; basilar length, 40; greatest breadth, 31.3; nasals, 15; diastema, 12.4; upper molar series, exclusive of p_3 , 8.8 mm.

HABITAT.—Batam Island, Rhio Archipelago (type from Tanjong Turut).

TYPE.—Adult male. B. M. No. 9, 4, 1, 170. Original number 920. Collected 14th July, 1908.

It might be difficult to distinguish certain individuals with exceptionally well-marked lateral stripe from extreme specimens of *Sc. r. peninsularis*, but the brighter colouring of the hands and feet in *peninsularis* helps to make the two forms easily separable.

37. SCIURUS VITTATUS SUBLUTEUS.

Thos. and Wrought., Ann. Mag. N. H. (8), iii., p. 440 (1909).

♂ 1250, 1274, 1275, 1278; ♀ 1240, 1248, 1276. Si Karang, S.-E. Johore.

♂ 850. Tinggi Island, S. China Sea.

A local form of *Sc. vittatus*, the same size as *v. peninsularis*, characterised by the "soiled" pale yellow colour of the abdomen.

Closely resembling typical *vittatus*, but the general colour somewhat greyer, the abdomen "orange buff," it is "ochraceous buff" in typical *vittatus* and "tawny" in *v. peninsularis*; hands and feet greyer than in true *vittatus*, the golden grizzling so conspicuous in *v. peninsularis* entirely absent.

Skull as in typical *vittatus*, but teeth somewhat smaller.

DIMENSIONS OF THE TYPE:

Head and body, 191; tail, 186; hind foot, 47; ear, 17 mm.

Skull: greatest length, 51.5; basilar length, 41.3; greatest breadth, 30.5; nasals, 15.5; diastema, 13; upper molar series, excluding p_3 , 8 mm.

HABITAT.—Si Karang, S.-E. Johore.

TYPE.—Adult male. B. M. No. 9, 4, 1, 180. Original number 1250. Collected 1st August, 1908.

There is practically no variation throughout the series, and the form is recognisable at a glance from any other by the peculiar colouring of the belly.

[About sixteen specimens of this form have been actually preserved, and one of us has examined another 20, which were shot within 10 miles of the type locality at Tanjong Surat, and all agree in the

characters as given above. We are doubtful, however, whether the Tinggi squirrel, when a larger series is available, will be retained in this race. Moreover, specimens from Lemau Point on the east coast of Johore, not more than 15 miles from Tinggi, are indubitably *peninsularis*. The corner of Johore, whence all but the Tinggi specimens come, is nearly an island, as a deep estuary, the Sungai Lebam, runs up to within 4 or 5 miles of the east coast, while the Johore Straits and the estuary of the Johore River separates it from the mainland to the west. At Tanjong Boi, within 8 miles, as the crow flies of the type locality of this race, but on the other side of the estuary, *Sc. v. peninsularis* is common.--H. C. R. and C. B. K.]

28. *SCIURUS TENNIS*, HORSF.

♂ 1001, 1062, 1118; ♀ 1062a. Changi, Singapore Island.

♂ 856, 862; ♀ 859, 864. Bukit Timah, Singapore Island.

Topotypes.

[This small squirrel is widely distributed throughout the Peninsula up to about 4,000 feet, above which level it is, in Pahang and Selangor, replaced by *Sc. tennis tahan*, a considerably larger form, which, apart from dimensions, can be recognised by the yellow buff, not white annulations to the hairs of the tail.

Though we have not actually seen topotypes of *Sciurus tennis surdus*, Miller, described from Trang, we have had through our hands some hundreds of specimens from all localities south of a point about 150 miles south of Trang, and have been unable to draw any constant distinction, however slight between this large number and some 30 or 40 topotypes of *Sc. tennis* from Singapore. From the fact that the authorities of the United States National Museum have distributed specimens from Johore under the name *Sc. tennis surdus*, Miller, it would appear that they restrict the typical *tennis* to Singapore Island, a conclusion with which we cannot agree.--H. C. R. and C. B. K.]

30. *SCIURUS SEIMUNDI*.

Thos. and Wrought., Ann. Mag. N. H. (8), iii., p. 449 (1909).

Allied to, and of the same size as, *Sc. robinsoni*, Bonh., but having the pale belly area much narrowed and the hands and feet more coarsely made.

Fur soft and close, but rather short (7 mm. on the back). General colour above as in *robinsoni* but rather warmer especially on the foreparts; below much less tinged with buff than in that species, at most yellowish white. Dark colour of back produced downwards on the sides, so that the pale belly area, which is parallel sided and sharply defined, is much narrowed, and the pale areas on the inner sides of the upper arms and legs are isolated from it. Hands and feet coloured like the back, more heavily built than in *robinsoni*.

Skull of type much damaged, but not appearing to differ from that of *robinsoni*, except that the upper incisors seem slightly more inclined forwards.

DIMENSIONS OF THE TYPE:

Head and body, 115; tail, 86; hind foot, 32; ear, 12 mm.

Skull too damaged to yield reliable measurements except upper tooth series, exclusive of p^3 , 5.5 mm.

HABITAT.—Bliah, Kundur Island, Rhio Archipelago.

TYPE.—Old male. B. M. No. 9, 4, 1, 188. Original number 1505. Collected 21st August, 1908.

The narrowing of the belly colour by the prolongation downwards of the dark colouration of the upper surface serves to distinguish this species at a glance from *Sc. robinsoni*, Bonh., its only close ally.

We have named this species after Mr. E. Seimund, Mr. Robinson's assistant and taxidermist, to whose energy and collecting powers the richness of the Rhio collection is largely due.

[Squirrels of this type are really quite common in certain localities on the Peninsula, and considerable numbers of the local form named recently by Mr. Thomas, *Sc. robinsoni alacris*, have been collected in Selangor within the last few months. It is a ground species, running about in very thick undergrowth among fallen timber and rarely found at any height on the trees. It can only be shot, therefore, at very short range, and hardly any undamaged specimens with perfect skulls have as yet been secured.

The specimen from the Kateman River,* Eastern Sumatra, identified by Mr. Lyon as *Sciurus lowii*, Thos., must be very close to, if not identical with, this species.—H. C. R. and C. B. K.]

40. LARISCUS "INSIGNIS," † F. Cuv.

♂ 129. Gunong Ijau, Perak, 4,700 feet.

♂ 2035; ♀ 2036. Cheras, Selangor.

♂ 1055, 1057; ♀ 1102. Changi, Singapore Island.

[We have recently brought together a large series of *Lariscus* (until lately more generally known as *Funambulus*) with a view to elucidating the two species hitherto described from the Peninsula—viz., *L. peninsulae* (Mill.) from Trang, of which only one authentic specimen is known; and *L. insignis jalorensis* (Bonh.) type from Bukit Besar in the Patani States, of which we possess a very large series from all localities south of Perak, including specimens compared and identified with the type by Mr. Bonhote himself. It may briefly be stated that, with the exception of one specimen from Bukit Kutu in Selangor, which we are inclined to think abnormal, the whole of the very large series that has passed through our hands, except those from Johore and Singapore, can without hesitation be referred to the form described by Bonhote, without considering the validity of that form as compared with the typical *insignis* from Sumatra.

The five specimens that we have seen from Singapore, however, and others collected by Kloss in Johore, which were referred to *peninsulae*

* Lyon, Proc. U. S. Nat. Mus., xxiv., p. 642 (1908).

† *Laria* being preoccupied, we have suggested the name *Lariscus* in a paper published by the Zoological Society. (P. Z. S., 1909, p. 389).

by Bonhote (P. Z. S., 1906, p. 7), agree among themselves and differ very markedly from *jalorensis* in having the sides and flanks very much more rufous, almost orange. —H. C. R. and C. B. K.]

41. RHINOSCIURUS TUPAIODES,* BLYTH.

♂ 673, 674. Tanjong Malim, Perak-Selangor boundary.

♂ 2005, 2087; ♀ 2004, 2070. Cheras, Selangor.

The original *tupaoides* may be readily distinguished by its white-washed tail, the tips of the hairs being either white, or with but the faintest trace of buffy, in marked contrast to the strongly buffy-washed tails of all the other members of the genus.

Dr. Annandale, of the Calcutta Museum, has been good enough to inform us that, in the original specimen described by Blyth, the "tips of the hairs of the tail appear to have been pure white without any trace of ochraceous whatever."

The present collection includes a magnificent series of *Rhinosciurus*, a genus so rare that the British Museum only possessed four skins of it before we received the typical series of *R. robinsoni* from Tioman last year, and judging by the lists published, Dr. Abbott's collections included but very few examples of it.

Now, however, we have before us no less than 42 specimens, including series from each of the localities chiefly dealt with in the present paper.

It is a curious thing that in this genus the cheek-teeth wear down with unusual rapidity, so that many old specimens have the teeth worn quite down to the roots, or even altogether absent. In one case we have had to select as type a specimen without any teeth, but as these, when present, are of little diagnostic value, such a selection does not materially matter.

The forms contained in the genus may be arranged as follows :

- A. Tail hairs washed with whitish, Selangor, Malacca, etc. **tupaoides**
- B. Tail hairs tipped with buffy ochraceous.
 - a'. Muzzle of skull comparatively broad.
 - a". Hind foot 39 mm. or upwards.
 - a'''. Skull shorter, bullæ smaller, Perak ... **peracer**
 - b'''. Skull longer, bullæ larger.
 - a^t. Hind foot averaging about 40 mm., Singapore **leo**
 - b^t. Hind foot averaging about 42 mm., Rhio Islands ... **leo rhionis**
 - b''. Hind foot 36-38 mm., Tioman Island ... **robinsoni**
 - b'. Muzzle of skull very narrow, parallel sided, bullæ small, Borneo ... **laticaudatus**

* On further consideration, Thomas decides not to press his former contention ("Journal, Federated Malay States Mus.," ii., p. 104, 1908) that the English names in Gray's List of Mammals, 1843, should be considered technically as descriptions. As a result, the type of the present species is the specimen mentioned in 1855 by Blyth and not that in Gray's List.

It is to be noticed that the colour of the belly is different in the two sexes, owing to the male generally having a brown patch in the inguinal region, just in front of the hips, and this, with the brown colour of the scrotum, gives a much darker aspect to the under side than is the case in the females. Some few males are, however, without the brown patches.

[The habits of all the species of *Rhinosciurus* known to us are identical and what applies to one applies to all equally. They are strictly terrestrial and very shy, which accounts for their rarity in collections. Their diet, judging from numerous specimens that we have examined, is principally insectivorous, consisting of large ants and beetles. The tongue is very long and remarkably protrusible, and it is probable that gritty matter taken up with the insects by means of this organ accounts for the rapid wear of the teeth, which Messrs. Thomas and Wroughton have commented on above. The animals are generally found in the neighbourhood of large and rotten logs and, at the least alarm, take refuge beneath or in any available hole. The considerable number obtained was principally due to the efforts of one of our Dyak collectors, who developed a remarkable capacity for securing ground birds and mammals.—H. C. R. and C. B. K.]

42. RHINOSCIURUS PERACER.

Thos. and Wrought., *Ann. Mag. N. H.* (8). iii., p. 440 (1909).

♀ 89. Maxwell's Hill, Perak, 3,600 feet. 1st September, 1908.

B. M. No. 9, 4, 1, 252. Type.

General colour dark; light shoulder stripes scarcely perceptible; under surface of medium buffiness. Hands and feet dark, becoming black on the fingers and toes. Tail hairs tipped with buffy ochraceous, rather less broadly and conspicuously than in the more southern forms.

Skull curiously more like that of the Bornean *laticaudatus* than of the intermediate forms, the bullæ similarly small, the muzzle not quite so narrow and parallel sided.

DIMENSIONS OF THE TYPE measured in the flesh:

Head and body, 213; tail, 122; hind foot, 41; ear, 14 mm.

Skull: greatest length, 56; condylo-basal length, 52; greatest breadth, 26; length of bullæ, 11.7; upper molar series, exclusive of p^3 , 10 mm.

HABITAT and TYPE as above.

The occurrence of this *Rhinosciurus* with a buffy-washed tail to the north of *tupaoides* is curious, for the latter appears to range quite across the Peninsula, and to shut off *peracer* from all the other similarly-coloured forms to the south. Its skull is more similar to that of the Bornean species than to *leo*, the species occurring next south of *tupaoides*.

43. RHINOSCIURUS LEO.

Thos. and Wrought., t.c., p. 440 (1909).

♂ 1293. Si Karang, S.-E. Johore.

♂ 1032, 1122, 1123; ♀ 1058, 1066 (yg.), 1103, 1141. Changi, Singapore Island.

Like *R. peracer* externally, the general colour a little richer, the tail more broadly washed with buffy-ochraceous, and the under surface averaging whiter, though some specimens are quite as buffy below. Brown of hands and feet running on to the fingers and toes, these being only black just at the bases of the claws.

Skull longer than in *peracer*, and the bullæ markedly larger, the largest in the genus.

DIMENSIONS OF THE TYPE measured in skin:

Head and body, 204; tail, 122; hind foot, 41; ear, 18 mm.

Skull: greatest length, 58; condylo-basal length, 53; greatest breadth, 29; palatal length, 32.5; length of bullæ, 12.3 (no cheek-teeth remaining).

HABITAT.—Singapore Island and adjacent mainland (type from Changi, Singapore).

TYPE.—Old male. B. M. No. 9, 4, 1, 233. Original number 1122. Collected 24th July, 1908, by H. C. Robinson and E. Seimund.

This species is distinguished from the Peruk animal by its much larger bullæ, from the Selangor *tupaoides* by its ochraceous-washed tail and from its insular representative *rhionis* by its smaller average size and lighter belly.

The hind feet of the six adult Singapore specimens measure as follows: 39, 39, 41, 41, 41, 41 mm.

44. RHINOSCIURUS LEO RHIONIS.

Thos. and Wrought., t.c., p. 441 (1909).

♂ 1366, 1546, 1577, 1614, 1615. Karimon Island, Rhio Archipelago.

♂ 1473, 1511; ♀ 1446, 1504, 1510. Bliah, Kundur Island, Rhio Archipelago.

♂ 901, 937, 954, 955; ♀ 946. Tanjong Turut, Batam Island, Rhio Archipelago.

♂ 763, 771. Pasir Panjang, Bintang Island, Rhio Archipelago.

Like true *leo* but the general colour slightly richer, the light shoulder stripes more evident, the belly more strongly suffused with buffy, varying from "cream buff" to "buff" or even occasionally "ochraceous buff." Size averaging greater, as shown by the length of the hind feet given below.

Skull bullæ large, but barely so large in proportion, on the average, as in true *leo*.

DIMENSIONS OF THE TYPE:

Head and body, 212; tail, 135; hind foot, 42.5; ear, 18 mm.

Skull: greatest length, 59; condylo-basal length, 55; greatest breadth, 28.8; palatal length, 32; length of bullæ, 12 mm.; front of p^4 to back of m^3 , 10.5.

HABITAT.—Rhio Archipelago, from Kundur on the west to Bintang on the east (type from Karimon).

TYPE.—Adult female. B. M. No. 9, 4, 1, 238. Original number 1366. Collected 13th August, 1908.

This Rhio form of *leo* is rather larger and lighter coloured with more strongly buffy belly, but the variation of the belly colour quite overlaps the Singapore series, while the lengths of hind feet also intergrade.

The following are some hind foot measurements of specimens from different islands:

Karimon	...	42, 42.5, 43, 43, 45	} Average of 17 specimens, 42.5
Kundur	...	42, 42, 42, 43, 43.5	
Batam	...	41, 42, 42, 42.5, 43	
Bintang	...	41.5, 42	

45. MUS "RATTUS," LINN.

♂ 1340, 1341 (imm.), 1345, 1350, 1359, 1360, 1361, 1376, 1378, 1382, 1393, 1394, 1398, 1401; ♀ 1335, 1346, 1358, 1362, 1373, 1374, 1377, 1379, 1380, 1384, 1386, 1392, 1400. Fernald, Karimon Island, Rhio Archipelago.

♂ 1313, 1314, 1327; ♀ 1316, 1319, 1320, 1321, 1323, 1326. Morah Island, near Karimon Island.

♂ 1416; ♀ 1413, 1422, 1424. Tanjong Balai, Karimon Island.

♂ 1587, 1588, 1590, 1591, 1592; ♀ 1562, 1567. Lekop, Karimon Island.

♂ 1601, 1602, 1603, 1604, 1605, 1622, 1659; ♀ 1608, 1609, 1610, 1655, 1660, 1661. Monos, Karimon Island.

♂ 1676, 1703, 1704, 1727, 1731; ♀ 1696, 1698, 1700, 1705. Little Karimon Island.

♂ 1430, 1463, 1465, 1508, 1513; ♀ 1431, 1432, 1447, 1453, 1464, 1467, 1467; ♂ 1514, 1515, 1530. Bliah, Kundur Island, Rhio Archipelago.

♂ 1535, 1538; ♀ 1537, 1539, 1541. Talang Island, Rhio Archipelago.

♂ 1162, 1181, 1186, 1191, 1239, 1242; ♀ 1169, 1185, 1189, 1237, 1241. Tanjong Surat, S.-E. Johore.

♂ 826. Leman Point, E. Johore.

♂ 838, 839, 841. Sibu Island, E. Johore.

♀ 1269. Si Karang, S.-E. Johore.

[With the exception of the series from Tanjong Surat and Si Karang, S.-E. Johore, which can be picked out at a glance as belonging to the form described by Mr. Bonhote as *Mus griseiventer*, these rats, though broadly referable to the true "rattus" group, impressed us as showing very great variation *inter se*. Those from Little Karimon are certainly different on cursory inspection from any of the many hundreds of the group from the Malay Peninsula and the vicinity that have passed through our hands.—H. C. R. and C. B. K.]

46. *MUS RATTUS RHIONIS*.

Thos. and Wrought., t.c., p. 441 (1909).

♂ 727, 739, 755, 774, 816, 817; ♀ 696, 713, 714, 734, 738, 746, 747, 818.
Bintang Island, Rhio Archipelago.

♂ 907, 947, 987. Batam Island, Rhio Archipelago.

♂ 995. Sauh Island (between Bintang and Batam Islands).

A form of *rattus* of the *rufescens* type of colouring, but darker than any other form known from this Archipelago.

Fur fairly long (18-20 mm. long on back) with comparatively few scattered spines. Individual hairs of the back grey with a one-third tip of "buff;" below white to their bases. The general colour above and below separated by a not very distinct dividing line.

DIMENSIONS OF THE TYPE (taken in the flesh):

Head and body, 187; tail, 187; hind foot, 35; ear, 20 mm.

Skull: greatest length, 44; basilar length, 36; zygomatic breadth, 20; braincase breadth, 16; diastema, 13; upper molar series, 6.7 mm.

HABITAT.—Bintang and Batam Islands, Rhio Archipelago (type from Bintang Island).

TYPE—Adult male. B. M. No. 9, 4, 1, 322. Original number 739.

The long series quoted above includes animals of both sexes and all ages which are remarkably uniform in their general appearance.

[One of the most distinct of the "*rattus*" group that we have met with in the region, on account of its dark colouration.—H. C. R. and C. B. K.]

47. *MUS KLOSSI*, BONH.

♂ 2061; ♀ 2019, 2023. Cheras, Selangor.

♂ 1208, 1210. Tanjung Penang, Sungai Lebam, S.-E. Johore.

♂ 1265. Si Karang, S.-E. Johore.

♂ 735, 756. Pasir Panjang, Bintang Island, Rhio Archipelago.

These undoubtedly represent Bonhote's *Mus klossi*,* but they agree so closely with Miller's description of *Mus asper* from Trang in the Northern Malay Peninsula that we think it probable that further material will show the two forms to be indistinguishable.

[We are both familiar with the true *Mus klossi*, one of the original specimens from Pelepah,† Johore, being now in the Selangor Museum collection. We had been inclined to refer the series, listed above and numerous other specimens in our collection, to *Mus asper*, Miller, though we have never seen a specimen from the typical locality: for though the lineal dimensions nearly agree, *Mus klossi* in the flesh is very less bulky than these, and might almost be described as a mouse and not a rat. The question is further complicated by the occurrence

* P. Z. S., 1906, p. 9.

† Spm. b' of Mr. Bonhote's List, loc. cit.

in the Peninsula of a form with grey belly, apparently the species described by Dr. Lyon as *Mus mandus*. These rats, which are nowhere very abundant, are found among the foot-hills in dry rocky country.—H. C. R. and C. B. K.]

48. *MUS VILLOSUS*, KLOSS.

Antea, vol. ii., p. 146.

♂ 1347/08. Botanical Gardens, Singapore Island (Co-type).

♂ 1135, 1138; ♀ 1137. Changi, Singapore Island.

♂ 1172; ♀ 1235. Tanjong Surat, S.-E. Johore.

♂ 1198. Boutan, Sungei Lebam, S.-E. Johore.

♂ 1204, 1207. Tanjong Penang, Sungei Lebam, S.-E. Johore.

♂ 1269. Si Karang, S.-E. Johore.

[This species is very distinct from any other known to us from the Peninsula or the islands round the coast. It is, however, certainly very close to *Mus bullatus*, Lyon,* from Pulo Rupert, Pulo Padang and the Kateman River in east and south-east Sumatra. Besides the localities quoted above, it also occurs in the vicinity of Kuala Lumpur, Selangor, but is nowhere very common.—H. C. R. and C. B. K.]

49. *MUS VALIDUS*, MILL.

♂ 78; ♀ 116, 165. Maxwell's Hill, Perak, 3,600 feet.

[Widely distributed from S. Johore to as far north as has been explored, and from the hills at 4,000 feet to swamps at sea-level. A rat of very unpleasant smell.—H. C. R. and C. B. K.]

50. *MUS FIRMUS*, MILL.

♂ 885; ♀ 989. Tanjong Turut, Batam Island, Rhio Archipelago.

♀ 993. Saub Island, Rhio Archipelago.

♀ 1347, 1364. Pemeral, Karimon Island, Rhio Archipelago.

♀ 1571, 1572. Monos, Karimon Island, Rhio Archipelago.

♂ 1599, 1628; ♀ 1598, 1629, 1653. Monos, Karimon Island, Rhio Archipelago.

♂ 1481, 1512; ♀ 1509, 1521. Bliah, Kundur Island, Rhio Archipelago.

[The island representative of *Mus validus* and somewhat commoner than that species.—H. C. R. and C. B. K.]

51. *MUS FERREOCANUS*, MILL.

♀ 67. Maxwell's Hill, Perak, 3,600 feet.

♀ 132, 141. Gnuong Ijau, Perak, 4,700 feet.

[This fine and very distinct species is only known at present from nine skins—the three original types from Trang and six specimens from the above localities. Those we have trapped have been secured in dense jungle among rocks. Its parti-coloured tail, white digits and pale yellow fronts to the incisors, distinguish it at a glance from *Mus validus*, the only other Peninsular species with which it could possibly be confused. Its nearest ally would appear to be *Mus berdmorei*, Blyth, from the Mergui Archipelago.—H. C. R. and C. B. K.]

* Proc. U. S. Nat. Mus., xxiv., p. 646 (1908).

52. *MUS SURIFER*, MILL.

♂ 94, 110; ♀ 75, 140. Maxwell's Hill, Perak, 3,600 feet.

♂ 134; ♀ 125, 138. Gunong Ijan, Perak, 4,700 feet.

♂ 649, 652, 715. Cheras, Selangor.

♂ 1253; ♀ 1206. Si Karang, S.-E. Johore.

♂ 1029, 1046, 1070, 1071, 1148; ♀ 1073, 1083, 1105, 1112, 1155. Changi, Singapore Island.

[This species is quite the commonest of the spiny rats in the Peninsula, and in the districts in which it occurs is a decided nuisance as it springs the traps before other and more desirable species have time to get caught. Even when caught, it is a most unsatisfactory animal as the skin is so papery and the pelage so harsh that it is almost impossible to make satisfactory Museum specimens out of it. It decomposes with unexampled rapidity and seems to be more attacked by ants, when in the trap, than any other rat.]

The form from Changi, Singapore, of which we secured some 50 or 60, struck us, in the flesh, as being both smaller and brighter than those from other localities, though in individual specimens the differences are not very tangible.—H. C. R. and C. B. K.]

53. *MUS LINGENSIS*, MILLER.

♂ 697, 700, 715, 725; 698, 721. Tanjong Tombak, Bintang Island, Rhio Archipelago.

♂ 778; ♀ 737. Pasir Panjang, Bintang Island, Rhio Archipelago.

♂ 888, 890, 904, 990, 991; ♀ 886, 889, 913, 916, 917, 984, 996, 992. Tanjong Tnurut, Batam Island, Rhio Archipelago.

♂ 1448, 1489, 1490, 1500, 1502; ♀ 1457, 1458, 1459, 1491, 1499, 1516. Bliah, Kundur Island, Rhio Archipelago.

♂ 1564, 1570; ♀ 1566, 1569, 1585. Lokop, Karimon Island, Rhio Archipelago.

♂ 1596, 1618, 1645, 1647, 1649, 1650; ♀ 1597, 1617, 1619, 1648. Monos, Karimon Island, Rhio Archipelago.

♂ 1668, 1670, 1671, 1672, 1675, 1690, 1693, 1720, 1721, 1722; ♀ 1674, 1678, 1685, 1691, 1690. Little Karimon Island, Rhio Archipelago.

[This is the Rhio representative of *Mus surifer*, and is equally common. The Kundur specimens seem rather larger than those from other islands, and some of those from Little Karimon, are decidedly greyer on the belly, but the differences are not very constant.—H. C. R. and C. B. K.]

54. *MUS BUKIT*, BONN.

♂ 147; ♀ 136. Maxwell's Hill, Perak, 3,600 feet.

[This is the second known locality for this species in the Malay Peninsula, the types coming from Bukit Besar in the Patani States; but it is said to occur also in "Siam." It is quite distinct from any other Peninsular rat, but evidently closely approaches *Mus jerdoni*, which is found on Mt. Mooleyit in Central Tenasserim.—H. C. R. and C. B. K.]

55. *MUS PELLAX*, MILL.

♂ 2069. Cheras, Selangor.

♀ T S. 50. Klang Gates, Selangor.

[Once one is familiar with this rat it is very readily distinguished from *Mus surifer*, though at first sight it is very liable to be confounded with worn and shabby specimens of that species.

It is somewhat smaller, and the upper surface is duller brown, without any tawny element in the pelage. Usually, but not invariably, there is a small white spot between the ears. The best differential character, however, is in the skull in which the nasals are invariably prolonged beyond the premaxillaries, which is never the case in *Mus surifer*. The species is frequently associated with *Mus surifer*, but in some localities occurs alone.—H. C. R. and C. B. K.]

56. *MUS CREMORIVENTER*, MILL.

♂ 119, 170. Maxwell's Hill, Perak, 3,600 feet.

[This rat is widely distributed over the northern parts of the Peninsula, but has not yet been found south of Perak, and what appears to be the same form is found on the islands of Langkawi and Terutau on the west coast.—H. C. R. and C. B. K.]

57. *MUS CONCOLOR*, BLYTH.

♂ 160, 162; ♀ 155, 163. Maxwell's Hill, Perak, 3,600 feet.

♂ 167. Taiping, Perak.

♂ 1179, 1183. Tanjong Surat, S.-E. Johore.

♂ 1209, 1211, 1212. Tanjong Penang, Sungei Lebam, S.-E. Johore.

♂ 1217. Tanjong Boi, S.-E. Johore.

♂ 1267, 1286. Si Karang, S.-E. Johore.

♀ 847. Tinggi Island, East Coast of Johore.

♂ 726. Tanjong Tombak, Bintang Island, Rhio Archipelago.

♂ 777. Pasir Panjang, Bintang Island, Rhio Archipelago.

♂ 1000; ♀ 997. Sauh Island, Rhio Archipelago.

♂ 1406, 1407, 1408, 1409, 1410, 1411. Balei, Karimon Island, Rhio Archipelago.

[So far as our experience goes, invariably associated with human beings. Miller has separated the form occurring on Tioman Island as *Mus pullus*, and several other allied forms have also been described from various islands, all of which approach very closely this species or its Sumatran representative *Mus ephippium*, Jent. Comparison with authentic specimens from Burmah is required before the group can be dealt with adequately.—H. C. R. and C. B. K.]

58. *MUS VOCIFERANS*, MILL.

♂ 68, 80, 113; ♀ 63, 92, 96, 172. Maxwell's Hill, Perak, 3,600 feet.

♂ 142; ♀ 124, 135, 146. Gunong Ijan, Perak, 4,700 feet.

♀ 42. Klang Gates, Selangor.

♂ 1289, 1291; ♀ 1257. Si Karang, S.-E. Johore.

[Very common throughout the Peninsula, wherever collections have been made, in hilly, jungly country from sea-level to over four thousand feet. On certain of the higher hills its place appears to be

taken by *Mus ciliatus*, Bonh., which is widely, though very sparingly, distributed.—H. C. R. and C. B. K.]

[When large series are examined, considerable variation is found to exist in the tail of this rat, which is by no means always bicolor, though the hairs on it are always white.—H. C. R. and C. B. K.]

59. *SUS OI*, MILL.

♂ 720. Tanjong Tombak, Bintang Island, Rhio Archipelago.

[Very common on Bintang, Batam, Sauh and Kundur Islands, but apparently not on Karimon. Very destructive to pine-apple plantations on Batam and Sauh, and according to the natives very bold, and not easily scared away from the gardens. Unfortunately, we never met with any of these courageous pigs, and as a result, the collection only contains one specimen, which was shot grubbing about on the reef at low tide.—H. C. R. and C. B. K.]

60. *SUS RHIONIS*, MILL.

♀ 1404. Pernal, Karimon Island, Rhio Archipelago.

The teeth of this specimen agree closely allowing for sex with the figure given by Mr. Miller of his type. Its parietal constriction, however, is 29 mm. across, a breadth considerably in excess of those recorded by Miller; no doubt the discrepancy is partly individual and partly due to immaturity.

[The "babi bakau," or Mangrove Pig, which includes both this and the succeeding species, is probably commoner than *Sus oi* in the Rhio Archipelago. It is a reef feeder, found on the shore in droves of eight or nine, and is also common in coconut and pine-apple plantations.—H. C. R. and C. B. K.]

61. *SUS ANDERSONI*.

Thos. and Wrought., Ann. Mag. N. H. (8), iii., p. 441 (1909).

♀ 815. Sungei Biru, Bintang Island, Rhio Archipelago.

♀ 880, 927. Tanjong Turut, Batam Island, Rhio Archipelago.

♀ 1349. Pernal, Karimon Island, Rhio Archipelago (*see below*).

A pig of the *vittatus* group characterised by the small size of its premolars.

Externally resembling *Sus rhionis*, Mill., but somewhat redder when young, and greyer when adult, than that species.

Skull rather longer than in *rhionis*; the molar tooth series markedly shorter, and all the premolars both shorter and narrower than in *rhionis*.

DIMENSIONS OF THE TYPE: .

Head and body, 1116; tail, 316; hind foot (c. u.), 236; ear, 86 mm.

Skull: upper length, 310; condylo-basal length, 270; palatal length, 185; width of palate inside p^1 , 30; width of palate, including m^3 , 59; least width of palate between alveoli of m^3 , 27; zygomatic breadth, 118; least interorbital breadth, 59; parietal constriction on upper surface, 33; nasal breadth at posterior extremity of premaxillæ, 33; length of nasals, 145; occipital depth to basion, 90.

Teeth: incisors * (*worn*); * p^2 , 10×4.8 ; p^3 , 11×8.8 ; p^4 , 10.8×12 ; upper molars, 57×17.3 ; p_2 , 11×5.2 ; p_3 , 12×6.8 ; p_4 , 12×9 . Lower molars, 81×14.6 mm.

HABITAT.—Islands of the Rhio Archipelago (type from Batam).

TYPE.—Adult female. B. M. No. 9, 4, 1, 511. Original number 927. Collected 15th July, 1908.

Four specimens examined.

The pigs from the islands of Batam and Bintang prove to belong to a species conspicuously different in the size of their teeth from *S. rhionis*, all the teeth being markedly smaller, the difference being especially noticeable in the second upper incisor and the premolars, as will be seen by measurements given above. With regard to No. 1349, labelled as from Karimon, whence Mr. Miller records *Sus rhionis*, we can only say that it agrees in every respect with *S. andersoni* but whether both species really occur on that island, or the specimen has been wrongly labelled, we are at present unable to say.

We have named this distinct Wild Boar in honour of Sir John Anderson, G.C.M.G., Governor of the Straits Settlements, and High Commissioner for the Federated Malay States, who has actively sympathised with the objects of the expedition.

[We are absolutely certain that three, and three only of the *rhionis* type of pig were collected on Batam and Bintang, and Mr. Seimund is equally positive that the two pigs labelled as collected in Karimon came from that island and no other.—H. C. R. and C. B. K.]

62. TRAGULUS KANCHIL RUBEUS, MILL.

♀ 730, 731, 744. Pasir Panjang, Bintang Island, Rhio Archipelago.

[Nowhere on the islands are mouse deer of the "kanchil" group so common as the larger species or "napu," though our collections from the mainland are richer in the former. This group is also much less liable to variation.—H. C. R. and C. B. K.]

63. TRAGULUS KANCHIL FULVIVENTER, GRAY.

♂ 1031; ♀ 1121. Changi, Singapore Island.

Comparison with the type shows that these are undoubtedly Gray's species. Whether Miller's *ravus* is also identical, or whether it is a northern local race, we are not at present in a position to decide.

Topotypes of *T. ravus*, Miller, from Trang are now available, so that this question will be shortly decided.

64. TRAGULUS STANLEYANUS PERFLAVUS, MILL.

♂ 902, 944, 959, 978, 979, 980, 981; ♀ 932, 933, 945, 952, 953, 955, 960, 982. Batam Island, Rhio Archipelago.

Though unfortunately the exact type locality of *T. stanleyanus*, Gray, is unknown, the present series is so closely like that species in all

* 11.8 mm. in an unworn specimen; 15.5 in an equally unworn specimen of *rhionis*.

but size, that we consider ourselves justified in ranking *perflavus* as a local race of the older established species. The present series are topotypes of Miller's *T. perflavus*.

[Exceedingly common on the island, the offer of 50 cents apiece producing large numbers from the local Malays.—H. C. R. and C. B. K.]

65. *TRAGULUS STANLEYANUS FORMOSUS*, MILL.

♂ 729, 823; ♀ 820, 822. Bintang Island, Rhio Archipelago.

Topotypes of *T. formosus*, Mill.

Though extreme specimens differ widely, those less well marked in this form and *T. stanleyanus perflavus* approach sufficiently close to justify this Bintang animal, being also placed as a local race of *stanleyanus*.

66. *TRAGULUS NIGROCINCTUS*, MILL.

♂ 1474, 1479, 1480, 1494; ♀ 1443, 1523. Bliab, Kundur Island, Rhio Archipelago.

♂ 1663; ♀ 1637. Monos, Karimon Island, Rhio Archipelago.

The specimens from Kundur are topotypes.

67. *MUNTIACTUS MOSCHATUS*, BLAINV.

♂ 753; ♀ 779. Bintang Island, Rhio Archipelago.

NOTES ON BIRDS NEW TO, OR RARE IN, THE MALAY PENINSULA.

BY HERBERT C. ROBINSON, C.M.Z.S., M.B.O.C.

SINCE the publication of my "Hand-list of the Birds of the Malay Peninsula, South of the Isthmus of Kra,"* and a further paper on "The Birds at present known from the Mountains of the Malay Peninsula,"† a considerable number of rare and interesting specimens have come to hand, concerning which it may be of interest to give some details:

COLUMBA PUNICEA.

Columba punicea (Blyth); *Salvadori, Cat. Birds Brit. Mus.*, xxi., p. 307 (1893).

Alsocomus puniceus, *Hume, Stray Feathers*, viii., p. 157 (1879).

A single female specimen was shot on the ground by one of the Museum collectors in the island of Terutau on the west coast of the Peninsula, some 80 miles north of Penang, early in March, 1909.

Hitherto the species does not appear to have been recorded south of the island of Tonka (*Hume, loc. cit.*) or, as it is variously called, Selanga or Junk Zeylon. The present occurrence is therefore an extension in range for the species of nearly a hundred miles.

* Journ. Fed. Mal. States Mus., ii., pp. 66-83 (1907).

† Tom. cit., pp. 164-222 (1909).

COLUMBA GRISEA.

Columba grisea, G. R. Gr.; *Salvadori, tom. cit.*, p. 248, pl. vii.

Columba phasma, *Richmond, Proc. U. S. Nat. Mus.*, xxvi, p. 490 (1908).

I had previously recorded this species as an inhabitant of the Malay Peninsula with some doubt.

In August, 1908, however, Mr. Seimund shot a pair on the island of Karimon, in the Rhio Archipelago, within sight of Singapore, so that the bird may fairly be retained in the Peninsular list.

The species seems to be widely spread on small islands from the coast of Sarawak to the chain of islands off the north-west coast of Sumatra, but is of doubtful occurrence on large land masses.

PORZANA AURICULARIS.

Porzana auricularis, Rehnw., *Journ. für Orn.*, 1898, p. 139; *Sharpe, Hand-list Birds*, i., p. 102 (1899).

Porzana pusilla, *Sharpe, Cat. Birds Brit. Mus.*, xxiii., p. 106 (1894).

Two specimens were secured on marshy ground, among long grass at Ampang, near Kuala Lumpur, Selangor, in March, 1908.

PSEUDOGLOTTIS GUTTIFER.

Pseudoglossitis guttifer (Nordm.); *Sharpe, Cat. Birds Brit. Mus.*, xxiv., p. 479 (1896); *Robinson, Journ. Fed. Mal. States Mus.*, ii., p. 69, No. 86 (1907).

I have previously (*loc. cit.*) recorded two specimens of this rare Limicoline bird from the mouth of the Kedah River, and on the 26th February, 1909, we obtained three more specimens on mud flats at the mouth of Kurau River in the Krian District of North Perak, 60 or 70 miles south of Kuala Kedah. On the Peninsular coast, therefore, the species is evidently by no means rare during the winter months, and its scarcity in collections is very possibly due to the strong superficial resemblance it bears to the common Greenshank.

GALLINAGO MEGALA.

Gallinago megala, Swinh.; *Sharpe, op. cit.*, p. 624.

An undoubted specimen of this species was shot by Mr. R. Charter at Ampang, near Kuala Lumpur, on the 12th December, 1909, and kindly presented by him to the Selangor Museum.

It has not previously been met with in the Malay Peninsula, though its occurrence was to be expected, in view of the fact that it is numerous in Labuan and North Borneo, during the winter months.

DISSOURA EPISCOPUS.

Dissoura episcopus (Bodd.); *Sharpe, Cat. Birds Brit. Mus.*, xxvi., p. 295 (1898).

Common on the island of Langkawi in February, 1909, and also in the Siamese West Coast State of Trang, about 180 miles north of Penang, in December of the same year.

HERODIAS ALBA.

Herodias alba (Linn.); *Sharpe, op. cit.*, p. 90.

The Large White Egret does not appear to have been previously recorded from the Malay Peninsula. A male was shot on the 11th March, 1909, at Sungei Pulai on the coast of Selangor. Wing, 15 inches; tarsus, 5.6 inches; culmen, 4.1 inches. The colour of the tarsi and bill incline me to the belief that the specimen should be referred to *H. alba*, of which it is an unusually small example, rather than to *H. timoriensis*, with which the dimensions agree better. The latter form has been recorded from North Borneo, but not from Sumatra or the Malay Peninsula.

ARDEOLA BACCHUS.

Ardeola bacchus (Bp.); *Sharpe, op. cit.*, p. 211.

A male in full breeding plumage was shot on Pulau Langkawi in March, 1909. The species has not hitherto been recorded further south in the Peninsula than Tongka.

ARDEOLA GRAYI.

Ardeola grayi (Sykes); *Sharpe, op. cit.*, p. 207.

Mr. R. Charter obtained a female in winter plumage at Klang on the 26th December, 1909, and presented it to the Selangor Museum.

Though pond herons of this genus are fairly abundant in the north of the Peninsula, in the winter months, they are hardly known south of Penang, and I very much doubt the correctness of the locality "Malacca" ascribed to Cantor's specimen now in the British Museum, except as meaning the Malay Peninsula in the widest sense. Most of Cantor's specimens came from the island of Penang, Province Wellesley, or the States to the northward.

ARDETTA PULCHRA.

Ardetta pulchra. *Hume, Stray Feathers*, i., p. 308 (1873).

Ardetta sinensis (*partim*), *Sharpe, op. cit.*, pp. 227, 229.

After examining a considerable number of individuals from the Malay Peninsula hitherto referred to *A. sinensis*, I have come to the conclusion that there are two perfectly distinct forms present—one which is migratory and only met with in the winter months being *Ardetta sinensis* (Gm.), and a second form characterised by much richer colouring with a bright chestnut patch at the angle of the wing. This is not improbably resident throughout the year, the three specimens in the Selangor Museum having been obtained in the months of April, June and December, while those of *A. sinensis* are dated January, March, October and December. This is the *A. pulchra* of Hume, originally described from the Andaman Islands. Dr. Sharpe (*loc. cit.*) takes note of the point but, considering the variation due to climatic influences, sinks the name as a pure synonym of the older name. It may, however, be retained with advantage as possibly indicating a resident tropical race.

BOTAURUS STELLABIS.

Botaurus stellaris (Linn.); *Sharpe, op. cit.*, p. 253.

A specimen of the Common Bittern obtained near Malacca on the 3rd March, 1909, by Mr. F. Day and presented to the Selangor State Museum, by the Raffles Museum, Singapore, is the second on record for the Malay Peninsula, the first having been shot on Perseverance Estate, Singapore, in the autumn of 1908.

ASARCORNIS LEUCOPTERA.

Sarcidiornis leucopterus, Blyth, *Journ. Asiat. Soc. Bengal*, xviii., p. 820 (1849).

Asarcornis scutulata, *Salvad. (nec Müll.)*, *Cat. Birds Brit. Mus.*, xxvii., p. 60 (1895); *Bonhote, P. Z. S.*, 1901 (i), p. 80 (*Patelung*).

This fine duck, one of the rarest of the Anatidæ, has hitherto been known from very few specimens, including two only from the Malay Peninsula, an old and deteriorated mounted specimen from the vicinity of Ipoh in the Kinta District of Perak, in the Selangor Museum, and the second, recorded above, obtained by the "Skeat Expedition" in Patelung and now in the Cambridge University Museum.

Annandale, who passed through Trang in May, 1902, records it as common in that State, though he did not obtain specimens.

In December, 1909, Mr. Kloss and myself obtained two specimens, male and female, at Chong, in Trang, at the foot of the dividing range. They came to feed in the rice fields at dusk and roosted in patches of jungle at the edge of the cultivated land. When disturbed, their flight was sustained and powerful, though not particularly rapid. They fed on large fresh water snails of the genus *Ampullaria*, and their crops and gullets were crammed with these and with one or two fresh water mussels.

Davison is recorded by Hume [*Stray Feathers*, viii., p. 158 (1879)] as having met the species in the forests of Kussom about a 150 miles north of Trang, but failed to secure specimens.

CIRCUS MELANOLEUCUS.

Circus melanoleucus, Blyth; *Sharpe, Cat. Birds Brit. Mus.*, i., p. 61 (1874).

Until recently this handsome species was represented in the Museums of the Federated Malay States by a single shabby mounted specimen without particulars, Mr. Seimund, however, obtained a very perfect adult male in open country near Kuala Lumpur on the 27th March, 1909, and states that the bird is not uncommon during the winter months, but is exceedingly wild and hard to approach. Two other species of Harrier, *C. aeruginosus* and *C. spilonotus*, occur with it, the former being by far the most abundant of the three.

An adult female was obtained also near Kuala Lumpur on the 18th January, 1910.

SPIZÆTUS NEPALENSIS.

Spizætus nepalensis (Hodgs.); *Sharpe, tom. cit.*, p. 267.

A young male was obtained by the Museum collectors at Sungei Udang, Pulau Terutau, north of Penang, on the 10th March, 1909.

This fine Forest Eagle has not hitherto been recorded from the Malay Peninsula, nor, according to Blanford (*Faun. Brit. Ind. Birds*, iii., p. 352, 1895), does it occur in Burmah.

The under surface is an almost uniform salmon buff as is also the head. The tail is whitish at the base with a very narrow white tip and six broad dark bars. Crest $3\frac{1}{2}$ inches long, dark brown with a buff base and a narrow white tip. The feathering of the legs extends well on to the terminal phalanx of the middle toe.

DIMENSIONS.—Wing, 16.4 inches; tail, 12 inches; tarsus, 4.1 inches. Bill from gape, 1.9 inches; culmen (from cere), 1.25 inches.

BAZA JERDONI.

Baza jerdoni (Blyth); *Journ. Asiatic Soc. Beng.*, xi., p. 464 (1842); *Blanford, Faun. Brit. Ind. Birds*, iii., p. 411 (1895).

Baza sumatrensis, *Sharpe, op. cit.*, p. 357, pl. xi., fig. i.; *Hume, Stray Feathers*, iii., p. 313; *Hume and Davison, op. cit.*, vi., p. 25; *Hume, op. cit.*, vii., p. 198, Note; *Gurney, op. cit.*, viii., p. 444.

There are three specimens of this Cuckoo-Falcon in the Selangor Museum—an adult, sex not determined, from Larut, Perak, mounted and in poor condition; an adult male from Sungei Kilim, Pulau Langkawi, north of Penang, shot on the 22nd February, 1909; and an immature female, dated the 23rd February, 1909, from the same locality.

ADULT MALE.—Top of the head blackish brown, sides of the face and loreal region grey, feathers of the nape broadly edged with rufous brown, mantle back and rump blackish brown. Tail lighter brown, whitish at the base, with four bars of blackish, the terminal one much the broadest, narrowly tipped with white; tail beneath barred black and white, the white bars much the broadest. Throat and upper breast dull rufous edged with white, the feathers in some cases with dark centres and shaft stripes. A blackish chin stripe. Breast, abdomen, flanks and under tail coverts barred with rufous brown and white, the white bars the narrower; the dark bars much more blackish on the flanks and more rufous on the thighs and under tail coverts. Axillaries similar, under wing coverts and angle of the wing rufous buff, barred, tipped and edged with white. Wing feathers (primaries, secondaries and tertials) inconspicuously barred with blackish and dull brown externally, markedly barred with black and greyish white, like the tail, on their internal aspect. Crest black, narrowly tipped with white.

DIMENSIONS.—Wing, 12.5 inches; tail, 9.1 inches; tarsus, 1.55 inches; bill from gape, 1.27 inches; bill from cere in straight line, .97 inches; crest, 2.3 inches.

F.M.S. GOVERNMENT PRESS

ON MAMMALS AND BIRDS FROM TRENGGANU.

By C. BODEN KLOSS, F.Z.S., M.B.O.U.

TRENGGANU is a district of the Malay Peninsula that has received very little attention from zoologists. In September and October, 1900, I visited it with Dr. W. L. Abbott in his yacht "Terrapin," and we spent a month working various places on the coast between the Trengganu and Kemaman Rivers. In September, 1910, I went there again, accompanied by the Museum Dyak collectors.

The results of both visits were a little disappointing. Owing to the nature of the soil and the great amount of clearing that has taken place in remote times along the coast, we could not reach any good collecting spots from our schooner on the first occasion; later, on my return from the exploration of the Redang and Perhentian Islands, I was pressed for time and, as the month was the month of fasting (bulan puasa), the natives not unreasonably refused to engage as carriers or boatmen to the inland districts. Thanks, however, to the assistance of the British Agent, Mr. W. D. Scott, who lent us his motor-boat, we were enabled to proceed seven or eight miles up the Sungei Nerus which enters the north bank of the Trengganu River, a mile above the town of that name, and a camp was made near Bukit Jong, a small hill 700 or 800 feet in height, on which still remains a small amount of virgin jungle. A week was passed in this locality, not a good one for our purpose, but the best available under the circumstances.

An excursion by canoe was also made to Pulau Kapas, an island which lies 11 miles south from Trengganu and a mile from shore, in the hope that species of small mammals might be found thereon. The trip was almost without result; two or three common birds and a form of *Mus rattus* alone being met with: and the latter was stated to be the only mammal inhabiting the island.

As no report on the visit of the "Terrapin" has been published, I now combine in one list the species then obtained and those of my more recent collections: of the first collection, the mammals are from my notes; for the birds I am indebted to Dr. C. W. Richmond, of the United States National Museum; and both are indicated by their localities, which at this date I can only give as "Coast of Trengganu"; though our principal collecting grounds were Trengganu Town, Tanjong Dungun, Pakeh River, Tanjong Laboha and Kuala Kemaman.

The only other visit of which I am aware is that paid by Messrs. Evans and Laidlaw, of the "Skeat" Expedition in October, 1899, when mammals appear to have been collected by both these gentlemen and birds by the latter. Mr. I. L. Bonhote in his reports on their

specimens * records from "Trengganu," under the name of *Sciurus caniceps*, Gray, two examples of a common squirrel which should stand as *S. concolor*, Blyth. The following birds were obtained, presumably all from Trengganu Town; of them only Nos. 2, 3, 8, 10 and 11 were not met with by me:

- | | |
|---|---|
| 1. <i>Turtur tigrinus</i> (Temm.). | 9. <i>Zantholaema haematocephala</i>
(P. L. S. Müll.). |
| 2. <i>Charadrius domenicus</i> (P. L.
S. Müll.). | 10. <i>Pitta cyanoptera</i> , Temm. |
| 3. <i>Ægialitis alexandrina</i> (Linn.). | 11. <i>Pitta cucullata</i> , Hartl. |
| 4. <i>Rhyacophilus glareola</i> (Gm.). | 12. <i>Rhipidura javanica</i> ,
Sparrm. |
| 5. <i>Haliaetus leucogaster</i> (Gm.). | 13. <i>Pycnonotus analis</i> (Horsf.). |
| 6. <i>Polioæetus ichthyaetus</i>
(Horsf.). | 14. <i>Calornis chalybea</i> (Horsf.). |
| 7. <i>Halcyon smyrnensis</i> (Linn.). | 15. <i>Æthiospar fuscus</i> (Wagl.). |
| 8. <i>Cacomantis merulinus</i> (Scop.). | 16. <i>Anthus rufulus</i> , Vieill. |

MAMMALS.

1. HYLOBATES LAR (LINN.).

Coast of Trengganu.

2. PRESBYTIS OBSCURA, *subsp*

Bukit Jong. 3 ♂.

These animals are members of a race of *P. obscura* which occurs also in the Perhentian Islands, and of which a description will shortly appear.

3. NYCTICEBUS MALAYANUS (ANDERSON).

Coast of Trengganu.

4. MUSTELA FLAVIGULA PENINSULARIS, BONN.

Bukit Jong. 1 ♀.

5. CYNOPTERUS BRACHYOTIS ANGULATUS, MILLER.

Coast of Trengganu.

6. RHINOLOPHUS, *sp.*

Coast of Trengganu.

7. TUPAIA FERRUGINEA, RAFFLES.

Bukit Jong. 1 ♂; 1 ♀.

Coast of Trengganu (Tanjong Dungun, 1 ♂, 1 ♀, in Selangor Museum).

These are typical *ferruginea*. I have compared them with topotypes from Singapore and can detect no difference whatever.

8. RATUFA MELANOPEPLA, MILLER.

Coast of Trengganu.

9. SCIURUS CONCOLOR, BLYTH.

Bukit Jong. 15 ♂; 9 ♀.

Coast of Trengganu.

I have compared this large series with another large series of topotypes from Nyalas, Malacca, obtained less than a month later. Series

* Proceedings of the Zoological Society, 1900, p. 877; 1901, vol. I, p. 87 et seq.

for series the Trengganu animals are a trifle duller—i.e., the top and sides of head are greyer, the ring round the eye is paler, and the orange-tawny suffusion of back and tail is less intense.

10. *SCIURUS (VITTATUS) MINIATUS*, MILLER.

Bukit Jong. 12 ♂; 12 ♀.

Coast of Trengganu.

A typical series, indistinguishable from Trang (type locality) and East Coast animals.

11. *SCIURUS (NIGROVITTATUS) BILIMITATUS*, MILLER.

Coast of Trengganu. 2 specimens.

One of these, a female from Tanjong Laboha, is the type. The race extends across the Peninsula to Upper Perak and goes northward.

12. *SCIURUS TENUIS*, HOEFT.

Bukit Jong. 7 ♂; 3 ♀.

Coast of Trengganu.

I have carefully compared the Bukit Jong series with a series of topotypes from Singapore. None of that dulness of pelage, which *S. tenuis* exhibits towards the northern extreme of its range, is traceable. On the contrary, the Trengganu series is more ochraceous than the Singapore collection, especially as regards the under surface of the body; the under parts of three males in particular being unmatched for depth and spread of that colour, while the abdomens of the remainder are decidedly more buffy, but the skulls and teeth do not differ appreciably.

Sciurus tenuis surdus, Miller,* was described from Trang examples, but, owing to the fact that until lately we had seen no topotypes, while the authorities of the United States National Museum had sent us specimens from Johore under that name, thus, apparently restricting the typical *tenuis* to Singapore Island, we had been unable to regard the race as valid.† We have recently, however, obtained a series of topotypes, and I am now prepared to accept Miller's race as distinct. It is confined, however, to the more northern parts of the Peninsula, though of course connected with *Sciurus tenuis typicus* by many intermediate animals, but, however indefinite many of these latter may be, by no means all individuals from the mainland must be placed under Miller's sub-species as I have shown above.

13. *MUS VOCIFERANS*, MILLER.

Coast of Trengganu.

14. *MUS SUBIFER*, MILLER.

Bukit Jong. 2 ♂; 1 ♀.

Coast of Trengganu.

* Proceedings of the Washington Academy of Sciences, vol. II, p. 8, July 25, 1900.

† Vide Journal of the F.M.S. Museums, vol. IV, No. 1, p. 117, December, 1909.

15. *MUS CREMORIVENTER*, MILLER.

Coast of Trengganu (Tanjong Dungun).

16. *MUS RATTUS JALORENSIS*, BONH.

Bukit Jong. 2 ♂; 2 ♀.

17. *MUS CONCOLOR*, BLYTH.

Bukit Jong. 2 ♂; 4 ♀.

18. *MUS DECUMANUS*, PALLAS.

Trengganu Town.

The mangled bodies of the Norway Rat were frequently to be seen in the streets in the early morning. A considerable trade between Trengganu and Singapore has long been carried on by native sailing vessels and has afforded a means for the introduction of this wide-spreading animal.

19. *TRAGULUS CANESCENS*, MILLER.

Bukit Jong. 1 ♀.

Coast of Trengganu.

Hind foot of Bukit Jong example, 134 mm.

BIRDS.

1. *EXCALFACTORIA CHINENSIS* (LINN.).

Coast of Trengganu.

These little Quails are fairly common along the coast, where there is much open grass land.

2. *PAVO MUTICUS*, LINN.

Bukit Jong.

Coast of Trengganu.

Peafowl are numerous in Trengganu: they are to be met with along the rivers and in open spaces near forests.

3. *OSMOTRETON VERNANS* (LINN.).

Coast of Trengganu.

4. *TURTUR TIGRINUS* (TEMM.).

Bukit Jong.

5. *GEOPELIA STRIATA* (LINN.).

Coast of Trengganu.

Both this and the last species are commonly seen feeding in the open grass lands, and in the rice-field after the crop is harvested.

6. *RHYACOPHORUS GLAREOLA* (GM.).

Bukit Jong.

The Wood-Sandpiper inhabits inland districts and is rarely seen near the sea.

7. *GARZETTA GARZETTA* (LINN.).

Coast of Trengganu.

8. *SPILORNIS PALLIDUS* (WALDEN).

Bukit Jong.

9. *HALIAETUS LEUCOGASTER* (GM.).

Coast of Trengganu.

10. *HALIASTUR INTERMEDIUS*, GURNEY.

Coast of Trengganu.

11. *MICROHIERAX FRINGILLARIUS* (DRAP.).

Bukit Jong.

12. *EURYSTOMUS ORIENTALIS* (LINN.).

Coast of Trengganu.

13. *PELARGOPSIS MALACCENSIS*, SHARPE.

Coast of Trengganu.

Though inhabiting estuaries it is also common in inland districts.

14. *ALCEDO BENGALENSIS*, GM.

Coast of Trengganu.

15. *DICHEROS BICORNIS* (LINN.).

Bukit Jong.

The Double-casqued Hornbill is a bird that is not frequently seen in the Peninsula.

16. *CAPRIMULGUS AMBIGUUS*, HARTEI.

Bukit Jong.

17. *MACROPTERYX LONGIPENNIS* (RAFIN.).

Coast of Trengganu.

The Long-winged Swift frequents the Casuarinas along the beach.

18. *PYROTROGON NEGLECTUS*, FORBES & ROBINSON.

Coast of Trengganu.

19. *RHOPODYES SUMATRANUS* (RAFFLES).

Coast of Trengganu.

20. *RHINORTHA CHLOROPHEA* (RAFFLES).

Bukit Jong.

Coast of Trengganu.

21. *UROCOCCYX ERYTHROGNATHUS* (HARTL.).

Bukit Jong.

Coast of Trengganu. *

22. *CHOTORHEA MYSTACOPHANES* (TEMN.).

Coast of Trengganu.

23. *THEREICERYX LINEATA* (VIEILL.).

Coast of Trengganu.

The Brown-headed Barbet was obtained in some numbers during the first visit in 1900, but was not met with later. South of Trengganu and Kedah it is almost unknown: a single individual is on record from Central Pahang.

34. *MESOBUCCO CYANOTIS* (BLYTH).

Bukit Jong.

These Barbets are decidedly of the blue-eared northern type: the two forms must widely overlap each other on the East Coast, for Grant (*Fasciculi Malayenses Zoology, Report on the Birds*, p. 102) records black-eared individuals from Nawngchik in Patani.

25. *ZANTHOLAEMA HAEMATOCEPHALA* (MÜLL.).

Bukit Jong.

The Coppersmith was common round Bukit Jong, and was the only species of Barbet met with except the preceding.

26. *GEVINUS OBSERVANDUS*, HARTNET.

Coast of Trengganu.

Individuals of several species of Woodpecker are very numerous along the coast, where they are freely observed flying from tree to tree in the open country.

27. *TYNGIPICUS CANICAPILLUS*, BLYTH.

Coast of Trengganu.

28. *MIGLYPTES GRAMMITHORAX* (MAHL.).

Bukit Jong.

Coast of Trengganu.

29. *MIGLYPTES TUKKI* (LESS.).

Coast of Trengganu.

30. *TIGA JAVANENSIS* (LJUNG).

Bukit Jong.

Coast of Trengganu.

31. *CORYDON SUMATRANUS* (RAFFLES).

Bukit Jong.

Met with in the tops of high jungle trees.

32. *CYMBORHYNCHUS MALACCENSIS*, SALVAD.

The beautiful Blue-billed Gaper occurs in numbers near Bukit Jong, where its habit of perching and flitting along the banks of the river renders it conspicuous.

33. *XANTHOPYGIA XANTHOPYGIA* (HAY).

Bukit Jong.

This example and another obtained in Central Pahang a fortnight later are young males in immature plumage, which have evidently just arrived from the north. It is not common in this latitude: the only other specimens known to me are a pair from near Kuala Lumpur and a female shot eleven years ago on the Anambas Islands.

34. *HIRUNDO JAVANICA*, SPARR.

Coast of Trengganu.

35. MUSCITREX CINEREA, BLYTH.

Pulau Kapas.

The Ashy Flycatcher is rare in inland districts, but is often met with near the sea: in certain localities it appears to particularly delight in mangroves.

36. HYPOTHYMIS AZUREA (BONN.).

Coast of Trengganu.

Only found in deep jungle, where it frequents the lower branches, and is very fearless.

37. RHIPIDURA JAVANICA (SPARRM.).

Coast of Trengganu.

This Fantail Flycatcher is a bird of low scrub and open country.

38. TERPSIPHONA AFFINIS (BLYTH).

Coast of Trengganu.

39. (?) PERICROCOTUS FLAMMIFER, HUME.

Coast of Trengganu.

This should probably be *P. igneus*, Blyth, as *P. flammifer* is, in the southern parts of the Peninsula, of sub-montane habitat.

40. ÆGITHINA TIPPIA (LINN.).

Bukit Jong.

41. CHLOROPSIS CHLOROCEPHALA (WALD.).

Coast of Trengganu.

If Dr. Richmond's identification is correct, this forms a record for the southern extension of this species; I, myself, am only certain of having obtained *C. chlorocephala* in Trang, a hundred and fifty miles to the north.

42. IRENA PUELLA (LATH.).

Coast of Trengganu.

The northern species grades into the southern *C. cyanea* in this latitude, and I think birds from Trengganu may be referred with equal correctness to either.

43. EUPTILOSUS EUPTILOSUS, JARD. & SELBY.

Coast of Trengganu.

A widely distributed but nowhere common Bulbul.

44. ALOPHOIXUS PHAECEPHALUS (HARTL.).

Coast of Trengganu.

45. TRACHYOMUS OCHROCEPHALUS (GM.).

Bukit Jong.

Coast of Trengganu.

46. PYCNONOTUS ANALIS (HORST).

Coast of Trengganu.

47. *PYCNONOTUS PLUMOSUS*, BLYTH.
Bukit Jong.
Coast of Trengganu.
48. *PELLOERNEUM SUBOCHREACEUM*, SWINH.
Bukit Jong.
49. *TURDINUS OLIVACEUS* (STRICKL.).
Coast of Trengganu.
50. *TURDINUS MAGNIROSTRIS*, MOORE.
Coast of Trengganu.
51. *SETARIA MAGNA* (EYTON).
Coast of Trengganu.
52. *SETARIA CINEREA* (EYTON).
Coast of Trengganu.
53. *CYANODERMA ERYTHROPTERUM* (BLYTH).
Coast of Trengganu.
54. *MACRONUS PTILOSUS*, JARD. & SELBY.
Coast of Trengganu.
55. *MIXORNIS GULARIS* (RAFFLES).
Coast of Trengganu.
56. *COPSYCHUS MUSICHUS* (RAFFLES).
Coast of Trengganu.
57. *CITTOCINCLA MACRURA* (GM.).
Bukit Jong.
58. *BURNESIA FLAVIVENTRIS* (DELRSS.).
Coast of Trengganu.
59. *HEMIPUS OBSCURUS* (HORAF.).
Coast of Trengganu.
60. *PLATYLOPHUS ARDESIACUS*, CAR.
Coast of Trengganu.
61. *LANIUS TIGRINUS*, DRAP.
Bukit Jong.
62. *LANIUS SUPERCILIOSUS*, LATH.
Coast of Trengganu.
63. *MELANOCHLORA FLAVOCRISTATA* (LAFR.).
Coast of Trengganu.
64. *CORVUS MACRORHYNCHUS* (WAGL.).
Bukit Jong.
65. *PLATYSMURUS LEUCOPTERUS* (TEMN.).
Bukit Jong.
66. *DISSEMUMURUS PARADISEUS* (LINN.).
Bukit Jong.

67. *CALORNIS CHALYBEA* (HORSF.).

Bukit Jong.

68. *AGROPSAR STURNINUS* (PALL.).

Bukit Jong.

Coast of Trengganu.

Nowhere a common bird in the southern half of the Peninsula, though occasionally met with in large flocks.

69. *ÆTHIOSPAR FUSCUS* (WAGL.).

Bukit Jong.

Very common in open spaces.

70. *MUNIA ATRICAPILLA* (VIEILL.).

Coast of Trengganu.

71. *MUNIA MAJA*, LINN.

Coast of Trengganu.

72. *LIMONIDROMUS INDICUS* (GM.).

Bukit Jong.

73. *ANTHUS MALAYENSIS*, EYTON.

Coast of Trengganu.

74. *CYRTOSTOMUS PECTORALIS* (TEMN.).

Coast of Trengganu.

75. *CYRTOSTOMUS FLAMMAXILLARIS* (BLYTH).

Coast of Trengganu.

Dr. Richmond has placed a note of interrogation against this title, and I think the bird in question is probably an example of the last species. *C. flammillararis* is hardly likely to occur so far south.

76. *ÆTHOPYGA SIPARAJA* (HORSF.).

Coast of Trengganu.

77. *ANTHOTHREPTES HYPOGRAMMICA* (S. MÜLL.).

Coast of Trengganu.

78. *ANTHOTHREPTES MALACCENSIS* (SCOP.).

Bukit Jong.

Coast of Trengganu.

79. *DICAËUM CRUENTATUM*, LINN.

Coast of Trengganu.

The following species were observed :

Treron nipalensis, Hodgs.
Carpophaga aenea (Linn.).
Tringoides hypoleucus (Linn.).
Gallinago stenura (Kuhl.).
Fregata aquila (Linn.).
Spizaetus limnaetus (Horsf.).
Halcyon pileatus (Bodd.).
Buceros rhinoceros (Linn.).

Anthracoceros, *sp.*
Macropteryx comata (Temm.).
Copsychus musicus (Raffles).
Eulabes javanensis (Osbeck).
Passer montanus, Linn.
Arachnothera longirostris
 (Lath.).
Dicaeum trigonostigma (Scop.).

ON MAMMALS AND BIRDS FROM THE LOWLANDS OF PAHANG.

By C. BODEN KLOSS, F.Z.S., M.B.O.U.

PAHANG has been but little explored zoologically, and the results of two small collecting visits to that State are now put on record.

The narrative of a trip up the Pahang, Tembeling and Tahan Rivers, undertaken in 1891 by Messrs. H. N. Ridley, W. Davison and Lieut. H. J. Kelsall, was accompanied by lists of mammals and birds observed and collected during the journey. These lists, drawn up by Mr. Ridley and Lieut. Kelsall, consist so largely of species observed, rather than obtained, that they are not altogether reliable, but they present the first information we have of the animal life of the region.

The mammals noted are the larger and commoner species only, but amongst the birds recorded are two or three of interest—viz., *Gerygone modiglianii*, Salvad (*G. pectoralis*, Davison), which was obtained for the first time in the Peninsula; a somewhat dubious species, *Setaria melanocephala* (Davison), which, if distinct, is very closely allied to *S. affinis*, Blyth, was described; and a new species of Myna, *Acridotheres torquatus*, Davison, was also obtained.

The next collection from Pahang was made by Mr. Waterstradt on Gunong Taban and is dealt with by Dr. Hartert in a paper entitled "On Birds from Pahang, Eastern Malay Peninsula": besides an account of the mountain birds it includes a number of species obtained by collectors in the lowlands of Pahang and also from the Sungei Lebeh.

More recent information is contained in the reports on the collections of mammals and birds made by Messrs. Robinson and Wray in 1905 on Gunong Tahan and at Kuala Tembeling.

Finally, some years ago, Dr. W. L. Abbott collected along the course of the Rompin River in South-eastern Pahang: no account of his specimens has been published, but the following were obtained or observed:

- | | |
|---|---|
| 1. <i>Hylobates lar</i> (Linn.). | 10. <i>Tragus rufus</i> , Miller. |
| 2. <i>Presbytis obscura</i> (Reid). | 11. <i>Ratufa melanocephala</i> , Miller. |
| 3. <i>Felis tigris</i> , Linn. | 12. <i>Ratufa aureiventris</i> (Geoffr.). |
| 4. <i>Paradoxurus hermaphroditus</i> ,
Pallas. | 13. <i>Sciurus tenuis</i> , Horsf. |
| 5. <i>Elephas maximus</i> , Linn. | 14. <i>Mus vociferans</i> , Miller. |
| 6. <i>Tapirus indicus</i> , Cuv. | 15. <i>Mus surifer</i> , Miller. |
| 7. <i>Bos gaurus hubbachi</i> ,
Lydekker. | 16. <i>Mus asper</i> , Miller. |
| 8. <i>Cervus unicolor equinus</i> , Cuv. | 17. <i>Tupaia malaccana</i> ,
Anderson. |
| 9. <i>Tragus canescens</i> , Miller. | 18. <i>Galeopterus peninsulæ</i> ,
Thomas. |

The collections dealt with below were obtained: the first during May, 1910, at Genting and Punjom, spots about seven miles west of Kuala Lipis, which localities are quoted as "Lipis"; the second during June of the same year, at places between six to nine miles west

of Bentong, which place, in default of any other name, is given as the locality of the specimens.

In view of our present knowledge of the lowland fauna of the Peninsula, there are very few points to enlarge on: a certain number of species are recorded from the district for the first time, of which perhaps *Sciurus robinsoni alacris*, Thomas, a form of *Sciurus prevostii*, Desm., and *Mus pellax*, Miller, are the more interesting among the mammals, though they are such as we should expect to find there; while the known distribution of others has been slightly extended.

Of the birds, the two specimens of *Alcedo euryzona*, Temm., the rare Banded Kingfisher, are the first which have been taken for many years in the Federated Malay States; while the unstable state of *Mesobucco duvauceli* (Less.), the commonness of *Munia leucogastra* (Blyth), scarcely ever met with in Perak or Selangor, and the fact that *Setaria affinis* (Blyth) occurs in an area where another closely allied form was thought to have replaced it, are all that call for comment.

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On Birds from Pahang, Eastern Malay Peninsula. *Novitates Zoologicæ*, ix, 1902, pp. 537-625. Quoted as "Hartert."

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Report on the Birds, Gunong Tahan Expedition. *Journal of the Federated Malay States Museums*, vol. III, 1908, pp. 15-57.
Quoted as "Grant."

MAMMALS.

1. HYLOBATES LAR (LINN.).

Hylobates lar, Bonhote, p. 2; Kloss, *Journal of the Straits Branch Royal Asiatic Society*, No. 53, 1909, p. 6.

Hylobates albimanus, Ridley, p. 57.

1 ♂. Lipis.

A specimen in the dark brown stage of pelage.

2. *PRESBYTES OBSCURUS* (REID).

Presbytes obscurus, Bonhote, p. 2; Kloss, op. cit., p. 7.

Semnopithecus obscurus, Ridley, p. 57.

2 ♀. Bentong.

Monkeys of the same species were also observed at Lipis. These specimens are somewhat pale in colour, the hands and feet alone being black. They exactly correspond with topotypes from Malacca.

3. *MACACA NEMESTRINA* (LINN.).

Macaca nemestrina, Kloss, op. cit., p. 9.

Macacus nemestrinus, Ridley, p. 57.

1 ♂. Bentong.

A young male with the posterior molars still uncut, closely resembling the adult female in colour. The fur is only slightly annulated and the wash of black on back and rump is not strong.

4. *NYCTICEBUS MALAYANUS* (ANDERSON).

Nycticebus malayanus, Kloss, op. cit., p. 11.

Nycticebus tardigradus, Ridley, p. 57.

1 ♂. Bentong.

This specimen is rather duller and colder in colour than usual. In this respect, and also in the large size of the skull (greatest length, 62 mm.; zygomatic breadth, 44 mm.), it approximates to *N. coucang* (Boddaert) of Burmah and E. Bengal.

5. *PARADOXURUS HERMAPHRODITUS*, PALAS.

Paradoxurus hermaphroditus, Kloss, op. cit., p. 22.

(?) *Viverricula malaccensis*, Ridley, p. 58.

1 ♀. Lipis.

1 ♂. Bentong.

The Lipis example shows the white-tipped tail, which so frequently occurs in this species.

6. *TRAGULUS RAVUS*, MILLER.

Tragulus rarus, Miller, Proc. Biol. Soc. Washington, 1902, p. 174.

Tragulus kanchil rarus, Bonhote, p. 11; Kloss, op. cit., p. 44.

Tragulus jaranicus, Ridley, p. 60.

1 ♀. Lipis.

7. *RATUFA AUREIVENTER* (GEOFFR.).

Sciurus aureiventer, Cantor, Jour. Asiatic Soc. Bengal, 1846.

Sciurus bicolor, Ridley, p. 59.

Ratufa affinis aureiventer, Bonhote, Ann. and Mag. Nat. Hist., (7), v, 1900, p. 495; Bonhote, p. 5.

1 ♀. Lipis.

1 ♂. Bentong.

Owing to the fact that the squirrels of the genus *Ratufa* are nearly always wearing out (a process to which the term bleaching has been

applied) or renewing their pelage, perfect specimens are rarely obtained, and this individual variation has been the cause of much uncertainty and some confusion.

At present, however, three races of brown *Ratufa* can be distinguished in the Peninsula :

(1) *Ratufa pyrrsonota*, Miller.

General colour above uniform ochraceous and brown, markedly annulated but becoming on fore legs, sides and thighs scarcely speckled tawny-ochraceous, under parts and inner surfaces of legs clear ochraceous. Top of muzzle dark brown, sides of muzzle whitish, cheeks and chin grizzled brown or whitish. Tail a variable brown, the bases of the hairs whitish, the latter colour conspicuous on the under surface where the short hairs clothing the vertebrae are brown. Feet dark brown.

Occurs in the northern half of the Peninsula. Waterstradt (*vide* Robinson) has obtained specimens in North Pahang, and it is known in Perak as far south as Kuala Kangsar.

(2) *Ratufa affinis* (Raffles).

General colour above a variable café-au-lait brown, the hairs dark tipped and very faintly annulated but becoming on neck, fore legs, sides and thighs tawny-ochraceous: under parts and inner surfaces of legs clear white or whitish-buff. Muzzle, cheeks and chin as in *R. pyrrsonota*. Feet whitish or light buff like the under parts.

Occurs in Southern Johore and Singapore Island.

(3) *Ratufa aureiventer* (Geoffr.).

Nearly agrees with *R. affinis* above but below resembles *R. pyrrsonota*. The back and tail are very variable, ranging from isabelline-brown to pale cream buff. As Cantor has correctly noted, the feet may be dark or light—in fact, they range from dark brown to ochraceous-buff, those of much bleached and abraded individuals often showing patches of both colours.

Occurs in the area between the districts occupied by the two preceding animals.

All these races agree in the possession of a notable pale patch on the outer side of the thigh, and in an annulated upper surface, though when the pelage is worn this often disappears entirely.

Mr. R. C. Wroughton, in a recent paper dealing with the Giant Squirrels (*Jour. Bombay Nat. Hist. Soc., Feb., 1910*), follows Mr. Bonhote in stating that *R. aureiventer* is a yellow-footed form and confines it to Malacca, while the range of *R. pyrrsonota* is given as from Trang to Selangor. But, as I have pointed out above, the former is both dark and light footed, and the gradation is so complete that the colour of the feet cannot be used as a differentiating character between these races, and *R. pyrrsonota* which, far from extending to Selangor, apparently barely enters the Federated Malay States, where *R. aureiventer*, as Mr. Bonhote correctly noted, is the prevailing form.

We must take it that *R. pyrrsonota* differs from the latter not so much in the colour of the feet as in the markedly annulated and ochraceous upper surface.

According to Mr. Bonhote, who last reviewed the squirrels of the *Prevostii* group (A. and M. N. H., 7, vii, 1901, p. 169), we have only two forms inhabiting the Peninsula: *Sciurus prevostii typicus*, in which the lateral white stripe runs unbroken from top of nose to heel of hind foot (extending also down the outer side of the fore limb), and *S. p. humei*, which has the shoulders fulvous-red, the colour of the fore limb extending upwards until it meets the black of the back. *S. p. typicus* appears to be confined to the southern extremity of the Peninsula ranging to Malacca, with perhaps Negri Sembilan, and the southern half of Pahang: I have examined Pahang examples from Tras, Liang and from the lower course of the Pahang River (Lebeh Tua). Examples of *S. p. humei*, Bonh., are known to me from Southern Perak (Blanja and Sungkai) and from localities throughout Selangor.

Two individuals of this group from Lipis and others from elsewhere fit with neither of these descriptions. From the first, they differ in having a variable degree of fulvous wash on the shoulders, and from the second, in that the colouring of the shoulders is never so intense or so large in extent. Their area of distribution seems to surround the red-shouldered form on the north and east, and I propose that individuals of this appearance should be known as:

8. *SCIURUS PREVOSTII WRAYI*, *subsp. nov.*

TYPE.—Adult male (skin and skull), No. 1,330/10, Selangor Museum. Collected at Genting, Kuala Lipis, Pahang, 11th May, 1910, by C. Boden Kloss. Original No. 3,261.

CHARACTERS.—Resembles *Sciurus prevostii*, Desm., but has the shoulders washed with the fulvous colour of the fore legs: differs from *S. p. humei*, Bonhote, in that the colouring of the shoulders is much less intense and frequently falls short of the black of the back.

COLOUR.—Above deep shining black. Below, including the entire fore limbs to elbows and the hind feet, a rich fulvous, deepest on the abdomen. On either side from back of shoulders to heel of hind feet a creamy white stripe broadening on the outer sides of the thighs. The fulvous hairs of the abdomen between shoulder and thigh adjoining this stripe have black bases. Sides of muzzle, chin, cheeks and sides of neck running up behind the ears chalky-white somewhat grizzled, the region below the eyes being darkest. Shoulders pale fulvous white, gradually deepening into the colour of the fore legs. Tail blackish below and grizzled at base, bleaching on the upper surface to a deep brown with a pale tip.

SKULL AND TEETH.—Skull and teeth do not in any way differ from those of the related forms.

MEASUREMENTS.—Collector's external measurements of type: head and body, 262; tail, 260; hind foot, 56; ear, 19.5. Cranial measurements of type: greatest length, 57; basal length, 48.3; median nasal length, 17; palatal length, 26.2; diastema, 14; molar row, 10.6; interorbital breadth, 24; postorbital constriction, 20; zygomatic breadth, 35.8.

REMARKS.—This squirrel, which appears to be distributed north and east of the related races, is intermediate between the two. The extent and depth of the colour on the shoulder are very variable, but the white lateral stripe is never entirely unbroken there as in *S. prevostii*, nor is ever attained the rich colour, widely in contact with the black back, of *S. p. humei*.

All other races of *Sciurus prevostii* with shoulder colouration of this type are instantly separable from *S. p. wrayi* by the grey or blackish sides of head and neck, which areas in the latter are whitish.

9. *SCIURUS HIPPURUS*, GEOFFR.

Sciurus hippurus, Bonhote, p. 6.

2 ♂. Bentong.

Nowhere common in the Peninsula and always rarer than the last species.

10. *SCIURUS CONCOLOR*, BLATH.

Sciurus caniceps concolor, Bonhote, Ann. and Mag. Nat. Hist., (7), vii, 1901, p. 272; Bonhote, p. 7.

Sciurus griseimanus, Ridley, p. 59.

3 ♂; 5 ♀. Lipis.

2 ♂; 2 ♀. Bentong.

All the specimens have the entire dorsal area and tail suffused with ochraceous, deepest on the rump.

11. *SCIURUS BILIMITATUS JOHORENSIS*, ROBINSON & WROUGHTON.

Sciurus bilimitatus, johorensis, Robinson & Wroughton, Journ. F.M.S. Mus., vol. IV, No. 2 *postea*.

2 ♂. Lipis.

1 ♂; 1 ♀. Bentong.

This race is much less ochraceous than *S. bilimitatus*, Miller, and these examples mark, as far as is known, its northward extension.

12. *SCIURUS MINIATUS*, MILLER.

Sciurus notatus miniatus, Miller, Proc. Washington Acad. Sci., vol. II, 1900, p. 79.

Sciurus vittatus, Bonhote, p. 5.

Sciurus notatus, Ridley, p. 59.

3 ♂; 1 ♀. Lipis.

3 ♂; 3 ♀. Bentong.

These examples agree completely with specimen of *S. miniatus* from the eastern side of the Peninsula. All have the distal portion of the tail very strongly rufous.

13. *SCIURUS TENUIS*, HORSE.

Sciurus tenuis, Bonhote, p. 6.

3 ♂; 1 ♀. Lipis.

1 ♀. Bentong.

These examples agree with topotypes from Singapore.

14. *SCIURUS ROBINSONI ALACRIS*, THOS.

Sciurus robinsoni alacris, Thomas, Ann. and Mag. Nat. Hist., (8), ii, 1908, p. 306.

1 ♀. Bentong.

This is the southern and paler form of *Sciurus robinsoni*, Bonhote, from Bukit Besar, Patani States, and has only hitherto been obtained on the boundary range in Pahang. It is now known from numerous localities in the Western States, where its southern limit at present is Negri Sembilan.

15. *LARISCUS JALORENSIS*, BONHOTE.

Funambulus insignis jalorensis, Bonhote, Fasciculi Malayenses Zoology, Part I, 1903, p. 26.

Funambulus insignis peninsulæ, Bonhote, p. 8.

Sciurus insignis, Ridley, p. 59.

2 ♂; 2 ♀. Lipis.

1 ♀. Bentong.

I have recently seen specimens of the striped Ground-Squirrel from Trang, whence came the single individual on which Mr. Miller's (*Smithsonian Miscellaneous Collections*, vol. 45, 1903, p. 25) *Funambulus peninsulæ* was based, which does not appear to differ from examples described as *Funambulus insignis jalorensis* by Mr. Bonhote, a name that has priority of date.

Though individuals from Perak to Singapore have been "lumped" by Messrs. Thomas and Wroughton (*Journ. F.M.S. Museums*, vol. IV, 1909, p. 118) under the name of *Lariscus insignis*, there is a marked difference between those from the Federated Malay States and the Northern Malay Peninsula and those from Southern Johore and Singapore; animals from the former area being only fulvous on shoulders and thighs, whereas the others are strongly fulvous throughout above, and below are washed with orange-fulvous on thighs and on sides of throat. The southern specimens differ decidedly from a large northern series (if from it be excluded an isolated specimen from Bukit Kutu, Selangor, which outdoes them in richness of colour but appears abnormal). Mr. Bonhote has referred (*P.Z.S.*, 1906, vol. I, p. 6) Johore specimens to *F. peninsulæ*, Miller.

16. *RHINOSCIURUS*, *sp.*

Funambulus laticaudatus, Bonhote, p. 9.

Sciurus laticaudatus, Ridley, p. 59.

1 ♂. Lipis.

An immature specimen.

(The only other specimen of *Rhinosciurus* known to me from Pahang, other than those referred to above, is a female obtained by

Lieut. Kelsall at Kota Glanggi in 1891 and now in the Raffles Museum, Singapore. It was identified by Mr. Thomas as *R. laticaudatus*, M. & S., but now that *R. laticaudatus* is known to be confined to Borneo, it must be recorded as an example of *R. tupaoides*, Blyth, as the tail hairs are distinctly washed with whitish.)

17. *MUS VOCIFERANS*, MILLER.

Mus vociferans, Miller, Proc. Biol. Soc. Wash., vol. XIII, 1900, p. 138.

1 ♀. Lipis.

2 ♂; 1 ♀. Bentong.

18. *MUS SURIFER*, MILLER.

Mus surifer, Miller, Proc. Biol. Soc. Washington, vol. XIII, 1900, p. 148.

4 ♀. Bentong.

19. *MUS PELLAX*, MILLER.

Mus pellax, Miller, Proc. Biol. Soc. Washington, vol. XIII, 1900, p. 147.

1 ♂; 2 ♀. Bentong.

This species has not hitherto been obtained from the eastern side of the Peninsula.

20. *MUS CREMORIVENTER*, MILLER.

Mus cremoriventer, Miller, Proc. Biol. Soc. Wash., vol. XIII, 1900, p. 114; Bonhote, p. 10.

1 ♂. Lipis.

This, at present, is the most southerly record for the east side of the Peninsula.

21. *MUS ASPER*, MILLER.

Mus asper, Miller, Proc. Biol. Soc. Washington, xiii, 1900, p. 145.

1 ♂. Lipis.

4 ♂; 3 ♀. Bentong.

The series serves to show the variability of *Mus asper*. It ranges from typical bright-coloured animals with rusty bellies to duller-backed individuals with grey under parts. Rats from Eastern Sumatra, with the latter characters and size a trifle greater than the typical *M. asper*, have been separated by Dr. M. W. Lyon (Proc. U. S. Nat. Mus., vol. XXXIV, 1908, p. 644) under the name of *Mus mandus*. But duller colour and greater size are by no means always associated in the Peninsular animals, and it does not appear at present desirable to recognise more than the one species in our area.

22. *MUS VALIDUS*, MILLER.

Mus validus, Miller, Proc. Biol. Soc. Wash., xiii, 1900, p. 141; Bonhote, P.Z.S., 1906, vol. I, p. 10.

2 ♀. Lipis.

Immature individuals are much darker above than adults and have grey under parts only slightly washed with buff.

23. *MUS JALORENSIS*, BONH.

Mus jalorensis, Bonhote, Fasciculi Malayenses Zoology, Part I, 1903, p. 28.

1 ♂. Lipis.

2 ♂. Bentong.

White-bellied members of the *Rattus* group which appear referable to *M. jalorensis*, Bonh.

24. *MUS CONCOLOR*, BLYTH.

Mus concolor, Bonhote, p. 10.

1 ♂. Lipis.

25. *RHIZOMYS SUMATRENSIS* (RAFFLES).

1 ♂. Lipis.

An old male. Head and shoulders cream-buff, under surface whitish. Outer sides of fore limbs, a line from occiput to saddle and remainder of pelage grizzled greyish brown. Head and body, 380; tail, 140; hind foot, 56; ear, 20 mm.

26. *TUPAIA FERRUGINEA*, RAFFLES.

Tupaia ferruginea, Bonhote, p. 3.

1 ♀. Lipis.

A very rufous individual.

27. *TUPAIA MALACCANA*, ANDERSON.

Tupaia malaccana, Anderson, Anatomical and Zoological Researches, 1878, p. 134.

Tupaia javanica, Ridley, p. 58.

1 ♂. Lipis.

28. *GALEOPTERUS PENINSULAE*, THOS.

Galeopterus peninsulae, Thos., Ann. and Mag. Nat. Hist., (8), ii, 1908, p. 303.

Galeopithecus volans, Ridley, p. 58.

1 ♀. Bentong.

A very ashy-backed example.

29. *MEGADERMA SPASMA TRIFOLIUM*, GEOFF.

2 ♂; 1 ♀. Bentong.

A common House-bat.

BIRDS.

PHASIANIDÆ.

1. *ROLLULUS ROULROUL* (SCOP.).

Rollulus roulroul, Hartert, p. 539; Grant, p. 57.

1 ♂. Lipis.

2. *ARGUSIANUS ARGUS* (LINN.).

Argusianus argus, Hartert, p. 538; Grant, p. 56.

1 ♀. Bentong.

COLUMBIDÆ.

3. *TRERON NIPALENSIS*, HOOGS.

Treron nipalensis, Grant, p. 54.

1 ♂. Lipis.

4. *MACROPYGIA RUFICEPS* (TEMN.).

Macropygia ruficeps (? an sp. nov.), Hartert, p. 541.

Macropygia ruficeps, Grant, p. 53.

1 ♂; 2 ♀. Bentong.

RALLIDÆ.

5. *RALLINA FASCIATA* (RAFFLES).

1 ♂. Lipis.

ANATIDÆ.

6. *DENDROCYGNA JAVANICA* (HOOGS.).

Dendrocygna javanica, Kelsall, p. 65; Hartert, p. 541.

FALCONIDÆ.

7. *SPILORNIS PALLIDUS* (WALDEN).

Spilornis bacha (? subsp.), Hartert, p. 541.

Spilornis bacha, Grant, p. 52.

1 ♀. Lipis.

8. *MICROHIERAX FRINGILLARIUS* (DRAP.).

Microhierax fringillarius, Kelsall, p. 60; Hartert, p. 541; Grant, p. 52.

2 ♂; 4 ♀. Bentong.

PSITTACIDÆ.

9. *PSITTINUS INCERTUS* (SHAW).

Psittinus incertus, Kelsall, p. 64.

Psittinus malaccensis, Hartert, p. 542; Grant, p. 51.

5 ♂. Lipis.

2 ♂. Bentong.

10. *LORICULUS GALGULUS* (LINN.).

Loriculus galgulus, Hartert, p. 542; Grant, p. 51.

3 ♂. Lipis.

ALCEDINIDÆ.

11. *PELARGOPSIS MALACCENSIS*, SHARPE.

Pelargopsis malaccensis, Kelsall, p. 63; Grant, p. 50.

Pelargopsis javana malaccensis, Hartert, p. 542.

12. *ALCEDO EURYZONA*, TEMM.

Alcedo euryzona (sic!), Hartert, p. 542.

1 ♂. Lipis.

1 ♂. Bentong.

The only previous record for Pahang of this Kingfisher—rare in the Peninsula—seems to be the specimen cited by Hartert to which no exact locality is attached. We had believed the bird to be a frequenter of mountain streams, but the localities where the above examples were obtained are decidedly in the lowlands.

13. *ALCEDO MENINTING*, HORSF.*Alcedo meninting*, Kelsall, p. 63; Hartert, p. 543.

2 ♂; 1 ♀. Lipis.

14. *CEYX TRIDACTYLA* (PALL).

2 ♂; 1 ♀. Bentong.

15. *CEYX EUERYTHRA*, SHARPE.*Ceyx dillwyni*, Hartert, p. 543.*Ceyx euerythra*, Grant, p. 50.

1 ♂; 1 ♀. Lipis.

16. *HALCYON CONCRETUS* (TEMN.).*Halcyon concretus*, Grant, p. 49.

1 ♀. Bentong.

BUCEROTIDÆ.

17. *BUCEROS RHINOCEROS* (LINN.).*Buceros rhinoceros*, Kelsall, p. 64; Hartert, p. 543.

1 ♂. Bentong.

18. *BERENICORNIS COMATUS* (RAFFLES).

1 ♂; 2 ♀. Bentong.

MEROPIDÆ.

19. *MEROPS SUMATRANUS* (RAFFLES).*Merops sumatranus*, Kelsall, p. 63.

3 ♂; 2 ♀. Lipis.

20. *NYCTIORNIS AMICTA* (TEMN.).*Nyctiornis amicta*, Kelsall, p. 63; Hartert, p. 544; Grant, p. 49.

1 ♀. Lipis.

1 ♂. Bentong.

CAPRIMULGIDÆ.

21. *CAPRIMULGUS AMBIGUUS*, HARTERT.(?) *Caprimulgus macrurus*, Kelsall, p. 63; Hartert, p. 544.

1 ♀. Lipis.

CYPSELIDÆ.

22. *COLLOCALIA INEXPECTATA*, HUME.

1 ♂. Bentong.

23. *CHAETURA LEUCOPYGIALIS*, BLATH.*Chaetura leucopygialis*, Grant, p. 46.

2 ♂; 1 ♀. Bentong.

24. *MACROPTERYX COMATA* (TEMN.).*Macropteryx comatus*, Kelsall, p. 63; Hartert, p. 544; Grant, p. 47.

1 ♂. Bentong.

TROGONIDÆ.

25. *PYROTROGON DUVAUCELI* (TEMN.).*Harpactes duvauceli*, Kelsall, p. 64.*Pyrotrogon duvauceli*, Hartert, p. 544.

1 ♂. Lipis.

1 ♂; 1 ♀. Bentong.

CUCULIDÆ.

26. *SURNICULUS LUGUBRIS* (HORSF.).

Surniculus lugubris, Hartert, p. 544; Grant, p. 45.

2 ♂; 1 ♀. Bentong.

27. *CACOMANTIS MERULINUS* (SCOP.).

Cacomantis passerinus, Kelsall, p. 64.

Cacomantis merulinus, Hartert, p. 544.

1 ♂. Bentong.

28. *RHOPODYTES DIARDI* (LESS.).

Rhopodytes diardi, Hartert, p. 545; Grant, p. 44.

1 ♂. Lipis.

29. *RHINORTHA CHLOROPHÆA* (RAFFLES).

Rhinortha chlorophæa, Kelsall, p. 64; Hartert, p. 545; Grant, p. 44.

1 ♂. Lipis.

1 ♀. Bentong.

30. *UROCOCCYX ERYTHROGNATHUS* (HARTL.).

Phoenicophaus erythrognathus, Hartert, p. 546.

Urococcyx erythrognathus, Grant, p. 44.

1 ♀. Bentong.

CAPITONIDÆ.

31. *CALORHAMPIUS HAYI* (J. E. GREY).

Calorhampus hayi, Kelsall, p. 64; Hartert, p. 546; Grant, p. 43.

2 ♂. Lipis.

1 ♂; 1 ♀. Bentong.

An immature individual from Lipis is strongly suffused with green both above and below, and the wing-coverts are tipped with ferruginous.

32. *CHOTORHEA CHRYSOPOGON* (TEMN.).

Chotorhea chrysopogon, Grant, p. 43.

2 ♂; 1 ♀. Bentong.

33. *CHOTORHEA VERSICOLOR* (RAFFLES).

1 ♂. Bentong.

34. *CHOTORHEA MYSTACOPHANES* (TEMN.).

2 ♂. Bentong.

35. *CYANOPS HENRICI* (TEMN.).

Cyanops henrici, Kelsall, p. 64.

1 ♂; 1 ♀. Lipis.

3 ♂. Bentong.

36. *MESOBUCCO DUVAUCELI* (LESS.).

Mesobucco duvauceli, Grant, p. 42.

2 ♂; 1 ♀. Lipis.

1 ♂. Bentong.

Of the specimens from Lipis, the first has clear black sinciput, ear-coverts, malar stripe and gular pouch; the second has the feathers of sinciput and gular pouch slightly tipped with blue and the ear-

coverts and malar stripe strongly washed with that colour; the third, a female, has sinciput and gular pouch completely obscured with blue, the ear-coverts are likewise blue and the malar stripe is greenish-blue. The Bentong specimen has black sinciput and malar stripe, the ear-coverts are greenish and the gular patch is much reduced. In certain areas at least the differences of colour which have given rise to two names appear largely due to differences of age and sex. Grant (Fasc. Mal. Zool., Report on the Birds, p. 102) records the black-eared form, *C. duravanci*, from so far north as Nawngchik in Patani: on the other hand, Trang birds are decidedly *C. cyanotis* as are also examples from Trengganu.

PICIDÆ.

37. GECINUS OBSERVANDUS, HARTERT.

Gecinus puniceus observandus, Hartert, p. 547.

Gecinus puniceus, Kelsall, p. 64; Grant, p. 41.

1 ♀. Lipis.

38. GECINULUS VIRIDIS, BLYTH.

2 ♂. Bentong.

39. IYUNGIPICUS CANICAPILLUS, BLYTH.

Iyungipicus canicapillus, Hartert, p. 547.

(?) *Iyungipicus auritus*, Kelsall, p. 64.

2 ♀. Lipis.

40. PYRRHOPICUS PORPHYROMELAS (BOIE).

Leptocestes porphyromelas, Kelsall, p. 64.

Pyrrhopicus porphyromelas, Grant, p. 40.

1 ♂ : 2 ♀. Bentong.

41. MIGLYPTES GRAMMITHORAX (MALH.).

Miglyptes grammithorax, Kelsall, p. 64; Hartert, p. 547; Grant, p. 41.

2 ♂ ; 1 ♀. Lipis.

1 ♂. Bentong.

42. MIGLYPTES TUKKI (LESS.).

Miglyptes tukki, Kelsall, p. 64; Hartert, p. 547; Grant, p. 40.

1 ♀. Lipis.

43. MICROPTERNUS BRACHYURUS (VIEILL.).

Micropternus brachyurus, Kelsall, p. 64; Hartert, p. 547; Grant, p. 41.

2 ♂. Lipis.

1 ♀. Bentong.

44. CHRYSOPHLEGMA MALACCENSE (LATH.).

Chrysophlegma malaccense, Kelsall, p. 64; Grant, p. 41.

Chrysophlegma miniatus malaccensis, Hartert, p. 546.

2 ♀. Bentong.

45. CHRYSOPHLEGMA HUMII, HARGITT.

Chrysophlegma humii, Kelsall, p. 64; Hartert, p. 546; Grant, p. 41.

3 ♀. Lipis.

2 ♂. Bentong.

46. CHRYSOCOLAPTES VALIDUS (TEMN.).

Chrysocolaptes validus, Grant, p. 41.

Chrysocolaptes rallidus, Kelsall, p. 64.

1 ♂; 2 ♀. Lipis.

47. HEMICERCUS SORDIDUS (EYTON).

Hemicercus concretus sordidus, Hartert, p. 547.

1 ♀. Lipis.

2 ♂. Bentong.

The two specimens from Bentong are immature. In one, forehead, crown and crest are equally mingled rufous-buff and slaty-grey, the terminations of the crest feathers being faintly tinged orange-red; in the second, forehead and crown are rufous-buff, the feathers having slaty terminations, and the crest is orange-red, rufous-buff towards the end, the extreme terminations of the feathers being slaty.

48. ALOPHONERPES PULCHRENTUS (TEMN.).

Humilophus pulchrentus, Kelsall, p. 64.

1 ♀. Lipis.

49. THRIPONAX JAVENSIS (HORST.).

Thriponax javensis, Kelsall, p. 64.

1 ♂; 2 ♀. Lipis.

50. SASIA EVERETTI, HARGITT.

Sasia abnormis everetti, Hartert, p. 547.

Sasia abnormis, Grant, p. 40.

1 ♂. Lipis.

1 ♂. Bentong.

The example from Bentong is immature and agrees in every respect with the description of the type (Hargitt, C.B.M., xviii, p. 559).

EURYLAEMIDÆ.

51. CALYPTOMENA VIRIDIS, RAFFLES.

Calyptomena viridis, Kelsall, p. 63; Hartert, p. 548; Grant, p. 38.

2 ♂; 1 ♀. Lipis.

3 ♂; 2 ♀. Bentong.

52. EURYLAEMUS JAVANICUS, HORST.

Eurylaemus javanicus, Kelsall, p. 53; Hartert, p. 548; Grant, p. 39.

1 ♀. Bentong.

53. EURYLAEMUS OCHROMELAS, RAFFLES.

Eurylaemus ochromelas, Kelsall, p. 63; Grant, p. 39.

4 ♂. Lipis.

2 ♂; 1 ♀. Bentong.

The female from Bentong is immature. It differs above from adult specimens in having the white collar faintly washed with yellow on the nape. Below there is no black gorget and the chin and upper throat are dusky only, the feathers being particoloured black and white and faintly washed yellow. Breast and abdomen are yellow, the dusky bases of the feathers showing on the breast, sides and flanks and down the

centre of the breast is a stripe of pale vinous purple. The subterminal spots on the tail are yellowish white, and there is a yellow supercilium extending from the nostril half-way over the eye.

54. CYMBORHYNCHUS MALACCENSIS, SALVAD.

Cymborhynchus macrorhynchus, Kelsall, p. 63; Grant, p. 39.

Cymborhynchus macrorhynchus lemniscatus, Hartert, p. 548

4 ♂; 2 ♀. Lipis.

1 ♂; 3 ♀. Bentong.

PITTIDÆ.

55. EUCICHLA BOSCHII, M. & S.

Pitta boschi, Kelsall, p. 63.

Eucichla irena, Hartert, p. 549.

1 ♀. Bentong.

Though common in Trang and other Siamese States, this *Pitta* is rare in the southern portion of the Peninsula and has been obtained recently only at Lenggong and Temengoh, Upper Perak, and at the above place. The locality, "Malacca," given for so many of the older specimens has now little value as it merely indicates that the skins came from a region on the west coast stretching from, and often including, Singapore to Penang.

HIRUNDINIDÆ.

56. HIRUNDO BADIA, CASS.

Hirundo badia, Kelsall, p. 63.

1 ♂; 1 ♀. Lipis.

MUSCICAPIDÆ.

57. CYORNIS SUMATRENSIS, SHARPE.

Cyornis sumatrensis, Hartert, p. 549.

1 ♀. Bentong.

58. ERYTHROMYIAS MUELLERI (BLYTH.).

Erythromyias muelleri, Hartert, p. 351.

1 ♂. Lipis.

1 ♂; 1 ♀. Bentong.

59. HYPOTHYMIS AZUREA (BODD.).

Hypothymis azurea, Hartert, p. 552; Grant, p. 37.

2 ♂; 1 ♀. Lipis.

2 ♂. Bentong.

60. RHIPIDURA PERLATA (S. MÜLL.).

Rhipidura perlata, Kelsall, p. 61; Hartert, p. 552; Grant, p. 36.

1 ♂. Bentong.

61. RHIPIDURA JAVANICA (SPARRM.).

Rhipidura javanica, Kelsall, p. 61.

1 ♂. Lipis.

62. TERPSIPHON AFFINIS (BLYTH.).

Terpsiphon affinis, Kelsall, p. 61; Hartert, p. 553; Grant, p. 37.

3 ♂; 1 ♀. Bentong.

Two of the males show the beautiful black and white adult plumage.

63. PHILENTOMA VELATUM (TEMM.).

Philentoma velatum, Kelsall, p. 61; Hartert, p. 553; Grant, p. 36.

1 ♂. Lipis.

1 ♂. Bentong.

64. PHILENTOMA PYRRHOPTERUM (TEMM.).

Philentoma pyrrhopterum, Kelsall, p. 61; Hartert, p. 553; Grant, p. 36.

1 ♂; 1 ♀. Lipis.

2 ♂; 1 ♀. Bentong.

65. RHINOMYIAS PECTORALIS (SALVAD.).

Rhinomyias pectoralis, Hartert, p. 553.

1 specimen. Lipis.

66. CULICAPA CEYLONENSIS (SWAINS.).

Culicapa ceylonensis, Hartert, p. 553; Grant, p. 35.

2 ♂. Bentong.

67. ABRORNIS SCHWANERI (TEMM.).

2 ♀. Bentong.

CAMPOPHAGIDÆ.

68. PERICROCOTUS FLAMMIFER. HUME.

2 ♂. Bentong.

PYCNONOTIDÆ.

69. ÆGITHINA VIRIDISSIMA (BF.).

Ægithina viridissima, Grant, p. 33.

1 ♂; 1 ♀. Lipis.

1 ♀. Bentong.

70. ÆGITHINA TIPHIA (LINN.).

Ægithina tiphia, Kelsall, p. 61; Hartert, p. 537.

1 ♂; 1 ♀. Lipis.

71. CHLOROPSIS ZOSTEROPS (VIG.).

Chloropsis zosterops, Kelsall, p. 61; Grant, p. 33.

1 ♀. Lipis.

4 ♂; 2 ♀. Bentong.

72. CHLOROPSIS ICTEROCEPHALA (LESS.).

Chloropsis icterocephala, Hartert, p. 537; Grant, p. 53.

2 ♂; 2 ♀. Lipis.

1 ♂; 2 ♀. Bentong.

73. CHLOROPSIS CYANOPOGON (TEMM.).

Chloropsis cynopogon, Hartert, p. 537; Grant, p. 33.

1 ♂. Bentong.

74. IRENA CYANEA, BEGGIE.

Irena cyanea, Kelsall, p. 62; Hartert, p. 537; Grant, p. 33.

1 ♂. Lipis.

1 ♀. Bentong.

75. HEMIXUS MALACCENSIS (BLYTH).

Hemixus malaccensis, Hartert, p. 538; Grant, p. 33.

1 ♂. Lipis.

76. IOLE OLIVACEA, BLYTH.

Iole olivacea, Hartert, p. 538; Grant, p. 32.

1 ♂; 1 ♀. Lipis.

1 ♂; 1 ♀. Bentong.

77. MICROTARSUS MELANOCEPHALUS (GM.)

2 ♂. Lipis.

2 ♂; 2 ♀. Bentong.

78. MICROTARSUS MELANOLEUCUS (EYTON).

Microtus melanoleucus, Grant, p. 32.

1 ♀. Lipis.

79. CRINIGER TEPHROGENYS, J. & S.

Criniger tephrogenys, Hartert, p. 538; Grant, p. 31.

1 ♀. Lipis.

2 ♂. Bentong.

80. CRINIGER FINSCHI, SALVAD.

Criniger finschii, Hartert, p. 560.

1 ♀. Lipis.

1 ♂. Bentong.

81. ALOPHOIXUS PHAEOCEPHALUS (HARTL.).

Criniger phaeocephalus, Kelsall, p. 61; Grant, p. 32.*Allophoixus phaeocephalus*, Hartert, p. 560.

3 ♂. Bentong.

82. TRICHOLESTES CRINIGER (BLYTH).

Tricholestes criniger, Hartert, p. 560; Grant, p. 31.

3 ♂; 2 ♀. Lipis.

1 ♂; 1 ♀. Bentong.

83. TRACHYCOMUS OCHROCEPHALUS (GM.).

Trachycomus ochrocephalus, Kelsall, p. 62.

1 ♂; 1 ♀. Bentong.

84. PYCNONOTUS ANALIS (HORSF.).

Pycnonotus analis, Kelsall, p. 62.*Pycnonotus goiavier analis*, Hartert, p. 560.

1 ♂. Lipis.

1 ♀. Bentong.

85. PYCNONOTUS FINLAYSONI (STRICKL.).

Pycnonotus finlaysoni, Hartert, p. 560.

2 ♂. Lipis.

2 ♂. Bentong.

86. PYCNONOTUS PLUMOSUS, BLYTH.

Pycnonotus plumosus, Kelsall, p. 62.

2 ♂. Lipis.

1 ♂; 1 ♀. Bentong.

87. PYCNONOTUS SIMPLEX, LESS.

Pycnonotus simplex, Hartert, p. 560; Grant, p. 31.

1 ♂. Bentong.

88. PYCNONOTUS SALVADORII, SHARPE.

Pycnonotus salvadorii, Hartert, p. 561.

1 ♀. Bentong.

89. RUBIGULA CYANIVENTRIS (BLYTH).

Rubigula cyaniventris, Hartert, p. 561; Grant, p. 31.

2 ♂. Bentong.

TIMELIIDÆ.

90. POMATORHINUS BORNEENSIS, CAR.

Pomatorhinus borneensis, Hartert, p. 562.

1 ♂. Bentong.

91. TURDINUS OLIVACEUS (STRICKL.).

Turdinus abbotti, Kelsall, p. 62; Grant, p. 29.

Turdinus abbotti olivaceum, Hartert, p. 562.

4 ♂; 2 ♀. Lipis.

1 ♂. Bentong.

92. TURDINUS SEPIARIUS (HORNE).

Turdinus sepiaria (? subsp. nov.), Hartert, p. 563.

1 ♂. Bentong.

Differs from the last species, which it very closely resembles, in its slightly smaller size, lighter bill, dark legs and feet and richer and darker upper surface, besides lacking the pale shaft-stripes to the crown-feathers possessed by *T. olivaceus*.

93. TURDINUS MAGNIROSTRIS, MOORE.

Turdinus magnirostris, Kelsall, p. 62.

Malacopteron magnirostris, Hartert, p. 563.

Malacopteron magnirostre, Grant, p. 29.

1 ♂; 1 ♀. Bentong.

94. TURDINUS MACRODACTYLUS, STRICKL.

Turdinus macrodactylus, Kelsall, p. 62.

1 ♀. Bentong.

95. ERYTHROCICHLA BICOLOR (LESS.).

Erythrocichla bicolor, Hartert, p. 563.

2 ♂. Lipis.

2 ♂. Bentong.

96. DRYMOCATAPHS NIGRICAPITATUS (BLYTH).

Drymocataphus nigricapitatus, Kelsall, p. 62; Grant, p. 29.

4 ♂. Lipis.

2 ♂; 1 ♀. Bentong.

97. *ETHOSTOMA ROSTRATUM* (BLYTH).*Trichastoma rostratum*, Hartert, p. 563.

2 ♂. Lipis.

2 ♀. Bentong.

98. *SETARIA MAGNA* (ETTON).*Malacopteron magnum*, Kelsall, p. 62.*Malacopteron magnum*, Hartert, p. 563.

1 ♂. Lipis.

2 ♂. Bentong.

99. *SETARIA CINEREA* (ETTON).*Malacopteron cinereus*, Hartert, p. 564.

1 ♂; 1 ♀. Lipis.

1 ♂; 2 ♀. Bentong.

100. *SETARIA AFFINIS* (BLYTH).(?) *Malacopteron melanocephalum*, Hartert, p. 565.

4 ♂; 2 ♀. Lipis.

Though the type of *Setaria melanocephala* (Davison) came from Kuala Tembeling, a locality less than 20 miles from Lipis, and Hartert records one other example from the Pahang lowlands, I prefer to list these specimens as *S. affinis*. According to Hartert the latter differs from *S. affinis* in its "deeper blackish crown, less rufous, more deep brown tail, slightly darker back." I have compared the present examples with an equal number of *S. affinis* from the vicinity of Kuala Lumpur and can detect no constant differences. Davison's single individual was apparently compared with *S. albigularis*, a very different bird, and it is quite possible to pick out from a series obtained at the same locality and time, one specimen differing from another to the extent of which Hartert separates *S. melanocephala* from *S. affinis*. The type of the previous species which belongs to the Raffles Museum, Singapore, is before me at the present moment: it has suffered much from careless treatment and is now of little value in settling the question, but I cannot recognise it as being in any way different from the series of twelve examples mentioned above.

101. *ANUROPSIS MALACCENSIS*, HARTL.*Anuropsis malaccensis*, Grant, p. 29.

1 ♂. Lipis.

3 ♂; 1 ♀. Bentong.

102. *ALCIPPE CINEREA* (BLYTH).*Aloippe cinerea*, Hartert, p. 566; Grant, p. 28.

1 ♀. Lipis.

3 ♂; 1 ♀. Bentong.

103. *STACHYRIS POLIOCEPHALA* (TEMN.).*Stachyris poliocephala*, Hartert, p. 566; Grant, p. 28.

1 ♂. Lipis.

2 ♂; 4 ♀. Bentong.

101. STACHYRIS MACULATA (TEMM.).

Stachyris maculata, Hartert, p. 566.

2 ♂; 1 ♀. Lipis.

1 ♀. Bentong.

105. CYANODERMA ERYTHROPTERUM (BLYTH).

Mixornis erythropterum, Kelsall, p. 62.

Cyanoderma erythroptera, Grant, p. 27.

1 ♂; 1 ♀. Lipis.

1 ♂. Bentong.

106. MACRONUS PTILOSUS, J. & S.

Macronus ptilosus, Kelsall, p. 62; Grant, p. 27.

3 ♂; 2 ♀. Lipis.

107. MIXORNIS GULARIS (RAFFLES).

Mixornis gularis, Kelsall, p. 62; Hartert, p. 567.

1 ♂; 1 ♀. Lipis.

2 ♂. Bentong.

108. HERPORNIS XANTHOLEUCA, HOLDS.

Herpornis xantholeuca, Grant, p. 25.

Erpornis xantholeuca, Hartert, p. 568.

1 ♂. Bentong.

TURDIDÆ.

109. HYDROCICHLA RUFICAPILLA (TEMM.).

Hydrocichla ruficapilla, Kelsall, p. 62; Hartert, p. 570.

6 ♂; 3 ♀. Bentong.

One of the males is immature. It differs from adults in being less intense in colour, head and back being rufous rather than orange-chestnut and the black areas varying from brown to sooty. The terminations of the feathers of the lower breast are rufous brown and the sides are washed with the same colour. The black frontal and rump bands are hardly traceable and the white termination of the tail feathers are only just beginning to appear, while the throat is mingled black and white. Hartert has pointed out that the white throat on which Sharpe founded *H. rufidorsalis* is part of the immature plumage of this species.

110. HYDROCICHLA FRONTALIS (BLYTH).

1 ♀. Lipis.

A species rarely obtained in the south of the Peninsula.

111. CITTOCINCLA MACRURA (GM.).

Cittocincla tricolor, Kelsall, p. 62; Grant, p. 23.

Kittacincla macrurus, Hartert, p. 571.

1 ♂; 1 ♀. Lipis.

1 ♂. Bentong.

SYLVIIDÆ

112. ORTHOTOMUS RUFICEPS (LESS.).

Orthotomus ruficeps, Kelsall, p. 62.

1 ♀. Bentong.

113. ORTHOTOMUS CINERACEUS (BLAIR).

2 ♂ Lipis

114. FRANKLINIA RUFESCENS (BLAIR).

1 ♂. Lipis

1 ♂ : 1 ♀ Bentong

LANIIDÆ

115. HEMIPTUS OBSCURUS (HOBBES.).

2 ♂. Lipis.

2 ♂. Bentong

116. PLATYLOPHUS ARDESIACUS, CUV.

1 ♀. Lipis.

1 ♀. Bentong

The Lipis specimen is immature. The feathers of the occiput are tipped with ferruginous as are the tertiaries and wing-coverts. The under surface is slaty-grey; the feathers of the throat have white terminations, and there is an irregular ferruginous band across the breast.

117. LANIUS CRISTATUS, LINN.

Lanius cristatus, Kelsall, p. 62.

1 ♂ Lipis

PARIDÆ.

118. MELANOCHLORA FLAVOCRISTATA (LAFR.).

Melanochlora sultanea, Grant, p. 21.

1 ♀. Lipis.

CORVIDÆ.

119. CORVUS ENCA, HOBBES.

Corone enca, Kelsall, p. 61

1 ♀. Bentong.

120. PLATYSMURUS LEUCOPTERUS (TEMN.).

Platysmurus leucopterus, Kelsall, p. 61; Grant, p. 16.

3 ♂; 1 ♀. Lipis.

3 ♂; 2 ♀. Bentong.

DICRURIDÆ.

121. CHAPTIA MALAYENSIS (HAY.).

Chaptia aenea, Grant, p. 17.

2 ♂. Bentong.

122. DISSEMURUS PARADISEUS (LINN.).

Dissemurus platurus, Kelsall, p. 61.

Dissemurus paradiseus, Hartert, p. 579; Grant, p. 17.

3 ♂. Lipis.

2 ♂. Bentong.

STURNIDÆ.

123. EULABES JAVANENSIS (OSBECK).

Mainatus javanensis, Kelsall, p. 63.

Eulabes javanensis, Grant, p. 17.

Gracula javanus, Hartert, p. 579.

2 ♂. Lipis.

PLOCEIDÆ.

124. PLOCEUS INFORTUNATUS, HARTERT.

Ploceus baya, Kelsall, p. 63.

Ploceus passerinus infortunatus, Hartert, p. 577.

Ploceus atrigulara, Grant, p. 18.

2 ♂; 1 ♀. Lipis.

125. MUNIA ACUTICAUDA, HODGE.

Uroloncha acuticauda, Kelsall, p. 63.

Munia acuticauda, Hartert, p. 579; Grant, p. 18.

1 ♂. Lipis.

3 ♂. Bentong.

126. MUNIA LEUCOGASTRA (BLATH).

Munia leucogastra, Hartert, p. 578; Grant, p. 17.

1 ♂. Lipis.

8 ♂; 4 ♀. Bentong.

This species was unrepresented, after years of collecting, in the Federated Malay States Museums until a single example was obtained at Temengoh, Upper Perak, in 1909. Now, we have this large series from Pahang, showing that it is common on the east side of the main range, and individuals have been obtained recently in the hills near Seremban, Negri Sembilan.

NECTARINIIDÆ.

127. ANTHOTHREPTES HYPOGRAMMICA (S. MÜLL.).

Anthothreptes hypogrammica, Kelsall, p. 62; Grant, p. 19.

Anthreptes hypogrammica, Hartert, p. 574.

1 ♂; 1 ♀. Lipis.

1 ♂. Bentong.

128. ANTHOTHREPTES MALACCENSIS (SCOP.).

Anthothreptes malaccensis, Kelsall, p. 62; Grant, p. 19.

Anthreptes malaccensis, Hartert, p. 573.

3 ♂; 2 ♀. Lipis.

129. CHALCOPARIA PHÆNICOTIS (GM.).

Chalcoparia singalensis, Hartert, p. 574.

1 ♂; 1 ♀. Bentong.

130. ARACHNOTHERA MODESTA, EYTON.

Arachnothera affinis modesta, Hartert, p. 574.

4 ♂; 1 ♀. Bentong.

131. ARACHNOTHERA LONGIROSTRIS (LATR.).

Arachnothera longirostra, Hartert, p. 574; Grant, p. 19.

1 ♂. Lipis.

1 ♂. Bentong

132. ARACHNOTHERA CRASSIROSTRIS (REICHENB.).

1 ♀. Lipis.

DICAËIDÆ.

133. DICAËUM CRUENTATUM (LINN.).

Dicaeum cruentatum, Kelsall, p. 62; Grant p. 20.

2 ♂. Lipis.

134. PRIONICHILUS IGNICAPILLUS, EYTON.

1 ♂. Lipis.

135. PRIONICHILUS MACULATUS, TEMM.

Prionichilus maculatus, Hartert, p. 575; Grant, p. 20.

1 ♂. Bentong.

NOTES ON INDO-MALAYAN SQUIRRELS.

By HERBERT C. ROBINSON, C.M.Z.S., AND R. C. WROUGHTON, F.Z.S.

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I.—THE *SCIURUS NIGROVITTATUS* GROUP.

S. nigrovittatus, the type of this section of the genus was described by Horsfield from Java (Zool. Res., 1824), since when the following races have been described:

- | | |
|---|--------------------------------------|
| <i>S. orestes</i> , <i>Thos.</i> [Ann. Mag. Nat. Hist. (6), xv., p. 529 (1895)]. | } Borneo. |
| <i>S. melanogaster</i> , <i>Thos.</i> [Ann. Mus. Civ. Gen., xiv., p. 668 (1895)]. | } Mentawai Islands, N.W. Sumatra. |
| <i>S. kloasii</i> , <i>Miller</i> [Proc. Wash. Acad. Sci., p. 225 (1900)]. | } Saddle Island, Tambelan Group. |
| <i>S. bilimitatus</i> , <i>Miller</i> [Smiths. Misc. Coll., 45, p. 8 (1903)]. | } Central Malay Peninsula. |
| <i>S. atratus</i> , <i>Miller</i> [Op. cit., p. 18 (1903)]. | } Pagi Islands, W. Sumatra. |
| <i>S. microrhynchus</i> , <i>Kloss</i> , Journ. Fed. Mal. States Mus., ii., p. 144. | } Tioman Island, E. Malay Peninsula. |

We now propose to separate the forms from the Southern Malay Peninsula and from Sumatra:

SCIURUS NIGROVITTATUS JOHORENSIS, *subsp. nov.*

A Southern Malay form of the size and pattern of *S. nigrovittatus bilimitatus*, but much less brightly coloured. Ochraceous colouring of face, etc., less bright than in *bilimitatus* and extending less on to the throat. Pale flank stripe dull buff not extending on to the hind leg. No bright colouring below the tail.

SKULL.—As in *bilimitatus*.

DIMENSIONS OF THE TYPE.—Head and body, 200; tail, 170; hind foot 45; ear, 17 mm. (measured in the flesh).

SKULL.—Greatest length, 48; basilar length, 38; zygomatic breadth, 31; nasals, 14.5; diastema, 11.5; upper molar series, 10 mm.

HABITAT.—The southern portion of the Malay Peninsula from Johore through the Settlement of Malacca, Negri Sembilan and Southern Pahang to Selangor, where it intergrades with the southern race. Specimens from Ulu Selama in Northern Perak are very brightly coloured and are to be referred to *Sc. nigrovittatus bilimitatus*.

The race from Tioan Island, *Sc. nigrovittatus microrhynchus*, Kloss, is, in external characters, close to the Johore form, but even duller with a greyer tail, lacking any ochraceous tinge, and differs further in the less robust skull with somewhat smaller teeth and feebler rostral region.

TYPE.—Adult female: B. M. No. 5. 12. 7. 16. Original No. 163 Collected at Pelepak, Johore, 24th March, 1905, by C. B. Kloss.

SCIURUS NIGROVITTATUS BOCKI, *subsp. nov.*

The Sumatran form differing from typical *nigrovittatus* by its somewhat smaller size and the brighter colouring of the flank stripes. From the races of the Malay Peninsula it is separable at once by the pale patches behind the ears.

SKULL.—As in these forms, but smaller in all details.

DIMENSIONS OF THE TYPE (from a skin specimen).—Head and body (c), 170; tail, (c), 150; hind foot, 43; ear, 15 mm.

SKULL.—Nasals, 14; diastema, 11.5; upper molar series, 9 mm.

(The skull of the type is much broken, but from another specimen it seems that the greatest length is 46 and the zygomatic breadth, 28 mm.)

HABITAT.—Sumatra.

TYPE.—Adult female. B. M. No. 79. 6. 28. 10. Collected by Carl Bock at Pajo in the Padang Highlands.

Besides another specimen from Pajo, there are two specimens skinned from spirits, in the collection, obtained by E. Modigliani from Si Rambli in Central Sumatra, which, allowing for the effect of alcohol on the colours, are not distinguishable from the type.

The following key may serve to distinguish the various members of the group:

I. General colour above an olivaceous grizzle;
below grey. Hands and feet finely
speckled with yellow.

A. Size larger; hind foot, 43.45 mm.

a. Grizzle of dorsal area coarser, belly darker,
flank stripes obsolescent (especially the
paler).

JAVA. *S. nigrovittatus*, HORSF.

b. Grizzle of dorsal area finer, belly paler, flank
stripes well marked.

α_1 . Hind foot, 45 mm. Pale patch behind ears indistinct.

α_2 . Side stripes very conspicuous, the paler extending in a darker shade as an indistinct stripe down the hind legs to the ankle. Face, chin, sides of neck, throat and chest bright ochraceous. Tail below bright hazel.

NORTHERN MALAY PENINSULA. *S. n. bismitatus* MILLER.

b_2 . Side stripes less conspicuous, no sign of extension of paler one down hind leg. Face, chin and sides of neck (rarely extending to throat) ochraceous buff. Tail below not brightly coloured.

a_3 . Rostrum slenderer, teeth smaller.

TIOMAN ISLAND. *S. n. microdorychnus*, KLOSS.

b_3 . Rostrum more robust, teeth larger.

SOUTHERN MALAY PENINSULA. *S. n. johorensis*, R. & W.

b_1 . Hind foot, 48 mm. Pale patch behind ears conspicuous. Tail below brightly ochraceous.

SUMATRA. *S. n. bocki*, R. & W.

B. Size smaller; hind foot, 36.40 mm.

α' . Patch behind ears well marked. General reddish suffusion above.

BORNEO. *S. n. oreutes*, THOS.

b' . Patch behind ears obsolete. No reddish suffusion above. Tail pencil pure black.

TAMBELAN ISLANDS. *S. n. kloesi*, MILLER.

II. General colour above near "seal brown," below blackish. Hands and feet dull black.

A. Above grizzled "brick-red," tail all black, below "slate-black."

PAGI ISLANDS. *S. n. atratus*, MILLER.

B. Above grizzled "ochraceous buff," below black, tail obscurely banded.

MENTAWAI ISLANDS. *S. n. melanophorus*, THOS.

ON SIX NEW MAMMALS FROM THE MALAY PENINSULA AND ADJACENT ISLANDS.

By HERBERT C. ROBINSON, CMZS, AND C. BODEN KLOSS, F.Z.S.

RECENT work on the collections of the Selangor Museum has shown that the following six races of Malayan mammals are sufficiently distinct to merit description :

1. *MUS RATTUS RUMPIA*, *subsp. nov.*

TYPE.—Adult male (skin and skull), No. 250/09, Selangor Museum. Collected on Pulau Rumpia, Sembilan Islands, off the Perak coast, W. Malay Peninsula, by E. Seimund, on the 7th March, 1909.

CHARACTERS.—Like *Mus rattus jalorensis*, Bonh., from the mainland of the Malay Peninsula, but considerably larger and darker above owing to the reduction of the ochraceous element in the pelage. The skull is more robust and the bullæ relatively larger.

COLOUR.—Above mingled ochraceous and sooty-brown, paler and somewhat greyer on the sides and darker on the rump and the median line of the back owing to the presence of numerous long black bristles. Under surface creamy white to the bases of the hairs, fairly clearly defined from the sides.

Under surface of scrotum greyish brown. Hands and feet flesh coloured, very thinly clad with pale hairs, darker on the median line of the feet.

SKULL AND TEETH.—Apart from its much larger size and more massive build, the skull of the present form is distinguished from that of *M. r. jalorensis* by the larger and more dilated bullæ and by the relatively shorter palatal foramina. Viewed from above, the rostrum is much heavier and broader, the cranium is more elongated and flattened and the postorbital ridges are heavier and more sharply deflected.

Apart from their greater size, the teeth do not differ.

MEASUREMENTS.—Collector's external measurements taken in the flesh : head and body, 180 (165*); tail, 207 (179); hind foot, 39 (30); ear, 23 (18) mm.

Cranial measurements : greatest length, 44.8 (41.5); basilar length, 37.0 (33.9); palatilar length, 21.5 (19.1); breadth between anterior molars, 4.5 (3.9); length of palatal foramina, 7.6 (7.1); breadth of rostrum at anterior extremity of foramina, 7.3 (6.8); diastema, 12.0 (11.9); length of upper molar row, 7.8 (7.1); median length of nasals, 15.8 (15.6); greatest breadth of combined nasals, 4.8 (4.2); interorbital breadth, 7.0 (6.1); cranial breadth, 16.5 (15.2); zygomatic breadth, 21.0 (19.0) mm.

The external measurements of twelve specimens average as follows, the figures in parentheses indicating the extreme range : head and body, 184 (175-200); tail, 209.8 (195-233); hind foot, 38.1 (37-39); ear, 22.7 (21-24).

* Measurements in parentheses are those of an adult male of *Mus r. jalorensis* from Bukit Jong, Trengganu (Selangor Museum, No. 2342/10).

SPECIMENS EXAMINED.—Six skins and nine skulls, all from the type locality.

REMARKS.—This race is readily separated from the mainland form by its much larger size, which is especially marked in the hind feet.

The series before us is very uniform both in size and in colouration, and does not differ from a further series of eight now in the British Museum, which were collected at the same time.

2. *MUS SURIFER LEONIS*, *subsp. nov.*

TYPE.—Adult male (skin and skull), No. 1.882/08, Selangor Museum. Collected at Changi, at the north-east corner of Singapore Island, by H. C. Robinson and E. Seimund, on the 22nd July, 1908. Original No. 1,048.

CHARACTERS.—Like *Mus surifer* from Trang, but more brilliantly tawny and size considerably smaller. Skull smaller with cranium rounder and relatively broader.

COLOUR.—Above brilliant tawny, sprinkled on the dorsal area and rump with brownish black: head, cheeks, sides of neck, shoulders and thighs, and sides along the line of demarcation from the belly, clear orange tawny. Under parts white, this colour extending to hands and roots of the vibrissæ and scarcely cut off from the white feet by the tawny colour of the outer thighs. A narrow tawny gorget across the chest. Tail bicoloured with terminal half white.

SKULL AND TEETH.—The skull in the broader and more globose cranium resembles rather the race dwelling in Terutau and Langkawi Islands than the mainland animal: the posterior terminations of the nasals are narrower than in the related forms.

MEASUREMENTS.—Collector's external measurements taken in the flesh: head and body, 172; tail, 179; hind foot, 41; ear, 23 mm.

The average measurements of thirty specimens are: head and body, 170.3; tail, 176.3; hind foot, 39.3; ear, 22.6 mm.

Cranial measurements of the type: greatest length, 43.1; basilar length, 32.5; palatilar length, 17.9; breadth between anterior molars, 4; length of palatal foramina, 6.1; breadth of combined foramina, 3.2; diastema, 12.2; length of upper molar row, 6.2; length of nasals, 15.8; interorbital breadth, 6.9; cranial breadth, 16.4; zygomatic breadth, 18.5 mm.

SPECIMENS EXAMINED.—Thirty from the type locality.

REMARKS.—Of the series the duldest are slightly brighter than the typical Peninsular animals, while the size is also decidedly less; but if this were due to immaturity, we should find them darker in colour.

When we first collected these rats we were struck with the differences as noted,* and re-examination of very large series of the allied forms, including topotypes of the typical race, confirms us in the opinion already expressed.

* Journ. Fed. Malay States Museums, iv, p. 125 (1909).

Though the variability of the mainland species occasionally produces individuals that match the Singapore animal in colour, yet the smaller size of the latter combined with their uniform tawiness indicates that they are a well-defined insular race, which, curiously enough, is more distinct from its geographical neighbour, *Mus surifer lingensis*, of the Rhio Archipelago than it is from the true *Mus surifer* of Trang.

From *Mus surifer flavidulus* of Langkawi Island, which it approaches in size, this race is easily separated by the brilliant colour and long tail; from *Mus surifer microdon* of Tioman Island, which approaches it in colour, it is distinguished by its smaller size, increased brightness and less interrupted white area of the under parts. The tawny gorget seen in the type is not of frequent occurrence.

3. SCIUROPTERUS (PETAURILLUS) KINLOCHII, *subsp. nov.*

TYPE.—Adult female (skin and skull), No. 2,668 '10, Selangor Museum. Collected at Jeram Estate, Kapar, Selangor, by V. Kinloch, Esq., on the 13th October, 1910.

CHARACTERS.—A Pygmy Flying Squirrel of the sub-genus, *Petaurillus*, of very similar dimensions to *Sc. horii*, Thos., from Sarawak,* but, with smaller skull, much shorter rostrum and longer tooth row, differs further in having the ears markedly shorter, colour more rufescent above, median facial area darker, sides of the neck with a pure buffy patch below the base of the ear, hairs of chest and abdomen with greyish bases and the upper median line of the tail black.

Ears elongated, with rounded tips, the anterior edges convex, the posterior almost straight. Vibrissæ attain a length of 40 mm.

COLOUR.—Above black washed with rufescent-buff, strongly on occiput and body, but the limbs and inner portions of the parachute only slightly grizzled with the same colour. The buff-washed areas have the bases of the hairs slaty, their median third black and their tips rufescent-buff. The outer portions of the parachute are pure black to the bases of the hairs, and the extreme edges above and below are fringed with blacked hairs about 3 mm. long with buff tips.

Top of muzzle a ring round the eyes and areas between the eye and ear and below the latter sooty-black. A patch of pure white about 6 mm. in diameter at the posterior bases of the ears extending on to their outer surfaces. Sides of muzzle, cheeks immediately below eyes and sides of neck pure pale rufescent-buff that, slightly interrupted by a small indefinite area of dusky hairs, extends below and round the bases of the ears, of which the posterior basal margins are black.

Below, under side of muzzle, posterior area of throat and upper chest white, the hairs concolorous throughout; anterior throat, body and limbs rufescent-buff, similar to cheeks, the bases of the hairs grey, under surfaces of parachute scantily clad with long hairs having dusky bases and white tips.

* *Annals and Magazine of Natural History*, (7), v., p. 275 (1900).

Upper sides of fore feet with a few black hairs on digits, wrists whitish, calcaneum from whitish proximally to ochraceous distally. Hind feet with inner sides buffy, their outer sides and heels black; proximal portion of digits buffy, extremities clad with white hairs overhanging the claws.

Tail above rufescent-buff, the hairs with white tips, thinly obscured by black hairs, which increase on the distal half where the underlying buff hairs have black sub-annulations: below almost pure rufescent-buff proximally, the edges paler; distally overlaid by black hairs as on the upper surface. The terminal, 15 mm., of tail pure white and buff.

SKULL AND TEETH.—These exactly agree with the characters given for the sub-genus by Thomas,* the skull being broad, low and short owing to the small size of the nasals, of which the posterior extremities and those of the premaxillaries are almost in a line. Mastoids inflated. The upper molar teeth show low and rounded ridges: p^4 is far less triangular than in the sub-genus *Sciuropterus* and is distinctly smaller than m^1 , p^3 , is placed mesially to it, so that m^1 , p^4 and p^3 diminish regularly in size and their centres are in line with one another.

MEASUREMENTS.—External measurements of the type in the flesh: head and body, 87 (87+); tail, 83 (98); hind foot, 19.4 (20); right ear, 18; left ear, 14 (17.5) mm.

Cranial measurements: greatest length, 26.0 (28.0+); basilar length, 20.1 (21.4); palatilar length, 10.2 (11.5); diastema, 5.1 (6.3); upper molar row, 4.75 (3.8); median nasal length, 6.5 (8.2); greatest breadth of combined nasals, 4.4 (4.0); interorbital breadth, 7.0 (7.0); greatest cranial breadth, 14.3; zygomatic breadth, 17.2 (18.8) mm.

SPECIMENS EXAMINED.—One, the type.

REMARKS.—This is the first example of the sub-genus obtained in the Malay Peninsula, the two other species known both coming from Borneo. We have named it in honour of Mr. V. Kinloch, who obtained and presented it to the Federated Malay States Museums.

4. *LARISCUS INSIGNIS MERIDIONALIS*, *subsp. nov.*

TYPE.—Aged female (skin and skull), No. 1,909/08, Selangor Museum. Collected at Changi, north-east corner of Singapore Island, by H. C. Robinson and E. Seimund, on the 22nd July, 1908.

CHARACTERS.—Intermediate between *Lariscus insignis diversus* (Thos.) from Borneo and *L. insignis jalorensis* from the northern and central portions of the Malay Peninsula (types examined), having the flanks and thighs strongly tinged with rufous and the general colour of the upper surface rufescent, not olivaceous grey.

COLOUR.—General colour above rufescent, speckled with black, becoming orange tawny on the shoulders and thighs and duller and more buffy on the flanks and between the dorsal stripes; head, fore limbs and feet darker and browner. Three black dorsal stripes running from the

* *Annals and Magazine of Natural History*, (8), i., p. 1 (1909).

† Measurements in parentheses are those of the type of *Sciuropterus hoosi*.

nape to the rum broader and more defined than in *L. i. jalorensis*. Under surface white, strongly tinged with orange buff anteriorly, and orange tawny on the thighs. Tail annulated black and orange tawny with paler tips to the hairs.

SKULL AND TEETH do not differ materially from those of *L. i. jalorensis*.

MEASUREMENTS.—Collector's external measurements taken in the flesh: head and body, 191; tail, 112; hind foot, 46; ear, 16 mm.

Cranial measurements: greatest length, 51.0; basilar length, 38.4; palatilar length, 20.2; diastema, 11.8; upper molar row, 9.1; median length of nasals, 14.7; greatest breadth of nasals, 6.9; interorbital breadth, 14.0; cranial breadth, 20.5; zygomatic breadth, 28.5 mm.

SPECIMENS EXAMINED.—Five from the type locality and two from Southern Johore.

REMARKS.—Examination of a series of topotypes shows that *Lariscus peninsulae* (Miller) * from Trang is identical with *Lariscus jalorensis* (Bonh.). † described about a month previously. The form described above is apparently confined to Singapore Island and the extreme south of the Peninsula as specimens from Nyalas in the interior of the Settlement of Malacca, though slightly brighter than typical *L. i. jalorensis*, are far nearer to that than to the present race.

Lariscus insignis insignis (F. Cuv.) from Sumatra, of which we have been able to examine a single example only, is a very much duller and greyer animal than either of the mainland races.

3. *T. PALEA FERRUGINEA WILKINSONI*, *subsp. nov.*

TYPE.—Adult male (skin and skull), No. 1,138/10, Selangor Museum. Collected at Ko-khau, Trang, Siamese Malaya, on the 12th January, 1910.

CHARACTERS.—Like *T. ferruginea ferruginea* from the southern portions of the Malay Peninsula, but, with paler shoulders, the ferruginous area being confined to the rump.

COLOUR.—Upper surface annulated black and ochraceous buff, producing an olivaceous effect, the head somewhat darker and more finely speckled, the rump and thighs suffused with ferruginous. An oblique yellowish-buff stripe from the sides of the neck to the shoulder. Under surface buff, yellowish on the throat and median line of the abdomen, whitish on the inner sides of the thighs. Tail above annulated black and buffy yellow, the latter colour being more conspicuous and whiter on the under surface. Hands and feet finely grizzled, the latter brownish.

SKULL AND TEETH do not differ from those of *T. f. ferruginea*.

MEASUREMENTS.—Collector's external measurements taken in the flesh: head and body, 180; tail, 175; hind foot, 42; ear, 16 mm.

* *Smiths. Misc. Coll.*, 45, p. 25 (Nov., 1903).

† *Fasic. Malay Zool.*, 1, p. 25 (Oct., 1903).

Cranial measurements: greatest length, 51.8; basal length, 44.9; palatal length, 28.0; width of palate at first molar, 9.5; zygomatic breadth, 25.9; least interorbital breadth, 14.5; cranial breadth, 20.9; tip of premaxillaries to lachrymal notch, 22.9; breadth of rostrum at diastema, 7.2; maxillary tooth row, 15.9 mm.

SPECIMENS EXAMINED.—Sixteen specimens from the State of Trang and three from lower Tenasserim.

REMARKS.—This race appears to be intermediate between *T. f. ferruginea* from the southern Malay Peninsula and *T. f. belangeri* from Aracan and Pegu. From the former it differs in its generally paler and less rusty colouration, and from the latter in its much longer rostrum.

The race is dedicated to Mr. R. J. Wilkinson, Secretary to Resident, Perak, in recognition of the lively interest taken by him in the recent expedition of the Federated Malay States Museums to Trang.

6. *PRESBYTIS NEGLECTA KEATHI*, subsp. nov.

TYPE.—Adult male (skin and skull), No. 1,231/10, Selangor Museum. Collected at Ko-khau, Trang, Siamese Malaya, on the 10th January, 1910.

CHARACTERS.—A member of the *femoralis-chrysomelas* section, distinguished from *P. neglecta* (Schleg.) of the southern portion of the Malay Peninsula and Singapore Island by its generally browner colouration, absence of white on the chest and by having the white femoral line produced quite to the heel.

COLOUR.—General colour clear brown, the tips of the long hairs slightly darker, paler on the occiput, nape, median dorsal line, elbows and buttocks. Frontal fringe, temporal tufts, sides of head and neck, hands and feet, extending up the posterior aspect of the limbs, and distal portion of tail, black. Inner side of upper arm, lower abdomen, extending broadly on to the thighs and thence in a regularly narrowing line to the heel, white.

SKULL AND TEETH present no differences from those of *P. neglecta*.

DIMENSIONS.—Collector's external dimensions taken in the flesh head and body, 538; tail, 820; hind foot, 176 mm.

Cranial measurements: greatest length, 94.5; basal length, 68.7; cranial breadth, 60.0; zygomatic breadth, 75.4; maxillary tooth row, 30.4 mm.

SPECIMENS EXAMINED.—Three from the type locality and three from the Larut Hills, Central Perak.

ON A COLLECTION OF MAMMALS AND OTHER VERTEBRATES FROM THE TRENGGANU ARCHIPELAGO.

By C. BODEN KLOSS, I.Z.S., M.B.O.U.

IN company with four collectors, a Malay orderly and a servant I left Trengganu town at 3 a.m. on 29th August, 1910, to make a zoological investigation of the Trengganu Archipelago. The vessel in which we sailed, and for which with its crew I am indebted to Mr. Walter D. Scott, British Agent, Trengganu, for his assistance in engaging, was a lug-rigged ketch of about 44 feet in length and 11 feet beam. She was unballasted and drew about three feet when loaded with our impedimenta and supplies. Though decked, the hold ran the whole length of the hull, but in the stern there was a raised cabin hatch giving six feet of head-room between roof and floor and this portion of the vessel was fitted with two bunks; the midship portion between the masts was occupied by a large hatch and forward of this again we carried on deck a wooden galley with a clay hearth. Our water was stored in jars and Mr. Scott kindly lent us a small boat which we towed astern. The prau was not a good sea-boat, her anchor and cable were untrustworthy and her sails so rotten that on a stormy night towards the end of the cruise they were practically blown away. She was very slow and we could not afford to press her owing to her indifferent sea-worthiness and poor gear. It was, however, only necessary to spend short periods on board as at the larger islands we took everything out of her and camped on shore.

The cruise, which lasted for eighteen days, was concerned with the vertebrate zoology of the islands with special reference to mammals. Species in particular, and individuals, with one or two exceptions, were not numerous.

Little Redang or Pulau Bedung, where one night was spent, produced eight mammals: Great Redang, where we camped for six nights, resulted in a collection of 106 specimens; a few hours spent at anchor one afternoon off Pulau Lantinga gave us 10 mammals and a sojourn of seven days in the Perhentians 181 more— a total of 305, of which a full account is given below.

The collection of birds numbered 95 specimens, of which *Calanus nicobarica*, hitherto only obtained (from the islands properly belonging to the Malay Peninsula) on Pulau Jarak, Straits of Malacca, and the Langkawi group was perhaps the most interesting. The remainder do not call for comment.

Reptiles were scarce, and insect life, as is usual on all such islands, was extremely scanty: the butterflies obtained numbered less than fifty specimens.

The only previous visit of a zoological nature to any of the islands appears to be that of some members of the "Skeat" Expedition to Little Redang in 1899, when the four species of birds mentioned below were obtained; but the example of *Calanus nicobarica* recorded by

Mr. J. L. Bonhote as coming from Kota Bharu, Kelantan (P. Z. 1908, vol. i., p. 77), indubitably came from one of the group.

The chain of small islands, of which Great Redang and the Perhentians are the chief, lies from 7 to 12 miles distant from the east coast of the Peninsula, to which it is roughly parallel, and extends through a length, N.-W. $\frac{1}{2}$ W. by S.-E. $\frac{1}{2}$ E. of about 30 miles. The islands belong to the Sultanate of Trengganu.

Though there are a number of rocks and small islets scattered about the vicinity only the four mentioned are of any interest.

Pulau Bedung, at the southern end of the chain, and the Perhentians, at the northern extremity, are situated apparently on the edge, but within the 10 fathom line which bends out to seaward in both instances to include them.

Great Redang, however, which lies rather farther from shore than the rest and is separated from the mainland by depths of 13 fathoms, is situated just within the 15 fathom line of which it forms a projection. Pulau Lantinga, in 16 or 17 fathoms, is alone outside the 15 fathom contour.

Little Redang, or Pulau Bedung, which is rather more than a mile in length and something less than a mile in width, attains a height of 985 feet. It has two small islets near its shores and several more five miles to seaward. The eastern side is edged with low cliffs, but to landward are two sandy beaches separated from each other by a rocky prominence; the bay fronting them is full of coral, cocopalms fringe the sand and beneath the trees are a dozen houses and a well of bad water. Beyond the village are plantations of tapioca and bananas, patches of hill paddy and a good deal of lalang grass. Behind, the island rises considerably, and being sterile and very rocky is covered with poor stunted forest. A path runs to the north end of the island. The few inhabitants possess a number of brightly-painted canoes of the Trengganu type and several trained brohs (*Macaca nemestrina*), obtained from the mainland, for collecting their coconuts.

The only land mammal except a rat is a dwarf squirrel, *Sciurus (vittatus) scotti*, of which a series was obtained, but two or three bats were reported to occur.

The birds met with were:

- | | |
|--|---------------------------------------|
| 1. <i>Myristicivora bicolor</i> (Scop.). | 3. <i>Demiegretta sacra</i> (Gm.). |
| 2. <i>Tringoides hypoleucus</i> (Linn.). | 4. <i>Eudynamis honorata</i> (Linn.). |
| 5. <i>Calornis chalybea</i> (Horsf.). | |

All were fairly common but no king-fishers or bulbuls were seen. Mr. Bonhote (P.Z.S. 1910, vol. i., p. 57 *et. seq.*) records the following collected by members of the "Skeat" Expedition:

- | | |
|---|--|
| 1. <i>Tringoides hypoleucus</i> (Linn.). | 3. <i>Dicrurus annectens</i> , Hodgs. |
| 2. <i>Corvus enca</i> , Horsf. (? <i>macrorhynchus</i>). | 4. <i>Anthothreptes malaccensis</i> (Scop.). |

Only the first was met with by us.

The only reptiles seen and obtained were *Calotes cristatellus* and *Mabuia multifasciata* : both these were common.

Great Redang lies eight miles N. b. W. from Little Redang : it is an island of fair size, having a greatest length of four miles and a breadth of three miles. Its height is 1,139 feet, and there are several small islets and rocks to the south and east; of these, the largest is Pulau Pinang which fronts the entrance of a triangular bay on the south side in which coasting steamers not infrequently find temporary refuge in the strength of the monsoon. Pulau Pinang is rocky to seaward and a ridge of rocks extends from it into the southern passage leading into the bay, but the shore facing Great Redang is sandy, and on that side is a fair-sized village whose occupants are mainly engaged in fishing. The northern extremity of Great Redang is rocky and is covered with poor jungle but the north-eastern side of the island is still more forbidding and sterile. In the centre of this face lies a bay about half a mile square with a broad sandy beach across its head and its sides bordered by low cliffs topped with stunted vegetation. The bay gives quiet anchorage for half the year and a little fishing by means of seine nets is done, but in the north-east monsoon the breakers on the beach are said to be very violent. The two bays mentioned are joined by a flat valley about half a mile wide and two long which divides the higher portions of the island into two parts: the southern portion of this flat area is entirely filled with mangroves with a small river running down its centre; this stream at low tide has only a foot of water at the mouth which is obstructed with coral, but greater depth within, and many turtles (*Chelone mydas*) inhabit it. Beyond the head-waters the land rises slightly and is occupied by plantations, then follows a wet swampy area which, save for a few rice fields, is overgrown by rushes, and beyond lies ground occupied by a village of a score or more houses surrounded by fruit trees, bananas, tapioca and maize growing on clearings made on the hill slopes. A few cattle were seen. Between the village and the northern bay exists kampong land dotted with pools of water and marshy spots. The whole valley has been cleared at one time, but is now either under cultivation or covered with lalang, scrub or short turf: the soil is poor. The forest covering the hills is at best thin and inferior, at the worst, where the slopes consist of little but rocks and boulders, it is a low dense scrub.

The mammals of the Great Redang group are as follows :

1. *Macaca fascicularis argenteimembra*. The "Kra" monkey is common on both Great Redang and Pulau Pinang.
2. *Tupaia (ferruginea) obscura*. This form of Tree-Shrew was fairly common.
3. *Crocidura major*. Three only of these small Musk-Shrews were taken though others were both seen and heard on several occasions during the daytime.
4. *Pteropus hypomelanus lepidus*, Miller. The Lesser Flying-Fox was seen many times. It is not gregarious and was

met with by day feeding solitary in the forest but was more frequently obtained in the cocopalms where it became active at dusk.

5. *Cynopterus angulatus*, Miller. Common at dusk in the cocopalms.
6. *Rhinolophus affinis superans*, Anderson. This Bat was fairly common in deep jungle where it was observed flying about during the daytime.
7. *Emballonura anambensis*, Miller. Two or three were seen every night in the palm groves.
8. *Sciurus (vittatus) plasticus*. This dwarf form of the common Red-bellied Squirrel was freely distributed throughout the islands but was least frequently met with in deep forest.
9. *Sciurus tenuis sordidus*. The Slender Squirrel was less common than the last species and was taken both in jungle and palm groves.
10. *Mus surifer grandis*. Fairly common in dry jungle.
11. *Mus rattus jalorensis*, Bonhote. Common everywhere.
12. *Tragulus rarus*, Miller. Only one specimen was obtained. The numerous village dogs were said to have driven the Lesser Mouse-Deer to the remote portion of the island and no natives could be persuaded to make snares.

It was stated that no Musang (*Paradoxurus*) or other carnivore occurred. The Flying-Lemur (*Galeopterus*), contrary to expectation, was neither met with nor heard of and pigs were absent.

The following birds were collected or observed :

- | | |
|---|---|
| 1. <i>Myristicivora bicolor</i> (Scop.). | 11. <i>Eudynamis honorata</i> (Linn.). |
| *2. <i>Chalcophaps indica</i> (Linn.). | 12. <i>Muscitrea cinerea</i> , Blyth. |
| 3. <i>Calenas nicobarica</i> (Linn.). | 13. <i>Cittocinclla macrura</i> (Gm.). |
| 4. <i>Ochthodromus pyrrhotorax</i> (Gould). | 14. <i>Orthotomus atrigularis</i> (Temm.). |
| 5. <i>Numenius phaeopus</i> (Linn.). | 15. <i>Calornis chalybea</i> (Horsf.). |
| 6. <i>Polioaetus ichthyaetus</i> (Horsf.). | 16. <i>Limonidromus indicus</i> (Gm.). |
| 7. <i>Alcedo bengalensis</i> , Gm. | 17. <i>Cyrtostoma pectoralis</i> (Hodgs.). |
| *8. <i>Ceyx euerythra</i> , Sharpe. | 18. <i>Anthothreptes malaccensis</i> (Scop.). |
| 9. <i>Halcyon humei</i> , Sharpe. | |
| 10. <i>Hierococcyx nasicolor</i> (Hodgs.). | |

The reptiles and batrachians obtained or observed were :

- | | |
|----------------------------------|---|
| 1. <i>Bufo parvus</i> , Blgr. | 4. <i>Acanthosaura armata</i> , Grey. |
| *2. <i>Chelone mydas</i> , Linn. | 5. <i>Calotes cristatellus</i> , Kuhl. |
| 3. <i>Draco volans</i> , Linn. | *6. <i>Mabuia multifasciata</i> , Kuhl. |

The cry of a large Gecko was frequently heard in the forest.

Pulau Lantinga lies five miles west of Great Redang; it is a mile and a half long and about half a mile broad; its summit is 520 feet high and is topped by a clump of big trees. To seaward the coast is very rocky but on the west side there is a stretch of flat land planted with cocopalms and a sand beach divided by a rocky headland edges this little plain. The better anchorage is off the northern stretch of sand but the other has the better water—a little waterfall amongst rocks. There were no inhabitants, but two or three ruined houses and sheds stood amongst the palms. The only mammals seen were an interesting squirrel, *Sciurus (vittatus) watsoni*, of which a series was obtained, together with a single Lesser Flying-Fox (*Pteropus hypomelanus lepidus*).

The only birds observed were:

- | | |
|---|----------------------------------|
| 1. <i>Tringoides hypoleucus</i> (Linn.). | 3. <i>Orthotomus atrigularis</i> |
| 2. <i>Ardea sumatrana</i> , Raffles. | (Temm.). |
| 4. <i>Cyrtostoma pectoralis</i> (Horsf.). | |

Of reptiles, *Mabuia multifasciata* was obtained and *Calotes cristatellus* was seen.

The last islands of any importance in the Trengganu Archipelago are the Perhentians which lie nine miles N.-W. & W. from Pulau Lantinga and the same distance from the coast. Both islands, which are separated from each other by a strait of water with a least width of half a mile, are approximately two and a quarter miles long, and the eastern, which is twice the area of the other, has a breadth of one and three-quarter miles; it is, however, almost sixty feet less in altitude, being 1,185 feet high.

West Perhentian is very sterile; there is practically no forest and the island possesses a somewhat unusual appearance through being largely covered with dense stretches of wild banana. The shore bordering the strait has been planted with cocopalms wherever suitable and a fair-sized village is situated at the south-eastern point of the island.

East Perhentian is uninhabited, though of a more inviting appearance than the other; more forest and less banana growth is to be seen. From the centre of its western shore a ridge of rocks stretches some distance into the strait which, south of this point, is narrow. Beyond, the channel widens, and the sheet of water lying between the two islands affords excellent anchorage during the S.-W. monsoon. Round the south-western portion of the island and opposite the village on West Perhentian are sand-beaches and a certain amount of flat land which has been planted with cocopalms, and there are cocopalms in the bays on the southern shore, but to the north the island is rocky with steep slopes.

Little collecting was done on West Perhentian owing to the nature of its surface and vegetation but the following mammals were obtained :

1. *Tupaia ferruginea longicauda*. A Tree-Shrew of markedly arboreal habits.
2. *Galeopterus pumilus* Miller. A Flying-Lemur inseparable from that occurring on several other islands near the shores of the Peninsula.
3. *Pteropus hypomelanus lepidus*. The Lesser Flying-Fox.
4. *Sciurus vittatus perhentiani*. A member of the *vittatus* group of Squirrels.

The mammal fauna of East Perhentian Island was ascertained to be as follows :

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. <i>Presbytes obscura styx</i>. A very dark race of the Dusky Lotong. 2. <i>Tupaia ferruginea longicauda</i>. 3. <i>Galeopterus pumilus</i>, Miller. 4. <i>Pteropus hypomelanus lepidus</i>, Miller. | <ol style="list-style-type: none"> 5. <i>Sciurus (vittatus) protens</i>. An insular race of the Red-bellied Squirrel exhibiting much variation within itself. 6. <i>Mus surifer flavigrandis</i>. |
|---|---|

7. *Mus rattus jalorensis*, Bonhote.

Three species of Bats (probably *Rhinolophus*, *Emballonura* and *Cynopterus* spp.) were seen but not obtained: it was reported that there were no pig or mouse-deer and no carnivore with the exception of a small wild cat (not *Paradoxurus* sp.) which was not met with, nor any form of macaque.

The following birds were collected or observed :

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. <i>Chalcophaps indica</i> (Linn.). 2. <i>Demigretta sacra</i> (Gm.). *3. <i>Ceyx euerythra</i>, Sharpe. | <ol style="list-style-type: none"> 4. <i>Acanthopneuste borealis</i> (Blas.). 5. <i>Corvus macrorhynchus</i>, Wagl. 6. <i>Calornis chabybea</i> (Horsf.). |
|--|--|

Of reptiles were obtained or seen :

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. <i>Rhacophorus leucomystax</i>, Gravenh. *2. <i>Chelone mydas</i>, Linn. 3. <i>Acanthosaura armata</i>, Gray. 4. <i>Calotes cristallus</i>, Kuhl. | <ol style="list-style-type: none"> 5. <i>Mabuia multifasciata</i>, Kuhl. 6. <i>Python reticulatus</i>, Schn. 7. <i>Dendrelaphis caudolineatus</i>, Gray. 8. <i>Simotes cyclurus</i>, Cantor. |
|---|--|

Below is a full account of all the mammals obtained: preliminary diagnoses of the new forms appeared in the "Annals and Magazine of Natural History" for January, 1911.

PRESBYTES OBSCURA STYX.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 116, 1911.

TYPE.—Adult male (skin and skull), No. 2,061/10, Selangor Museum, collected on East Perhentian Island, off Trengganu, east coast of the Malay Peninsula, 12th September, 1910, by C. Boden Kloss. Original No. 3,634.

CHARACTERS.—A race of *Presbytis obscura* (Reid), characterised by extremely dark colour and absence of any paler and redder area on shoulders and back.

COLOUR.—Front and sides of head, back, sides and outer surfaces of fore limbs, black. Under-parts, dark brown, very scantily clad. Nuchal patch, drab-grey. Tail and outer sides of thighs, dark-ashy grey, the tail somewhat silvery. Hands and feet, intense shining black. Hair of lips and chin, yellowish-white.

Natural colour of skin of face blue-black; of eye-patches, lips and chin, pale pinkish white; of abdominal skin, bluish-white; of hands and feet, black.

SKULL.—The skull does not appear to differ from mainland specimens, but the mandible is much heavier, being both squarer anteriorly and deeper generally: the height at the condyle especially is greater and the ascending ramus is rather less curved on the anterior edge.

If a series of mixed skulls of similar age are placed side by side resting on their mandibles it will be seen that the zygomata of the Perhentian animals will rest above those of the mainland individuals, also, owing to the elevation of the posterior portion of the skull, the former, when viewed from above, appear to be decidedly less prognathous.

MEASUREMENTS.—Collector's external measurements of type: total length, 1,332; head to symphysis pubis, 583; tail vertebrae, 797; hind-foot, 164. Cranial measurements: greatest length, 102; posterior occipital extremity to nasal spine, 84.3; posterior occipital extremity to glabella, 79.5; gnathion to median upper edge of supraorbital ridge, 46; gnathion to orbit, 29.2; orbit to posterior occipital extremity, 79; zygomatic breadth, 77; greatest orbital breadth, 62; post-orbital constriction, 43.2; greatest cranial breadth, 54; basal length, 73; palatal length, 33; palatal breadth at m^1 , 21; palatal breadth at m^3 , 18.3; greatest breadth of rostrum below roots of zygomata, 35; maxillary tooth-row excluding incisors, 35.2; mandibular tooth-row excluding incisors, 41.5; greatest length of mandible 75.5; height of mandible at condyle, 45.5.

SPECIMENS EXAMINED.—Four males and three females, all from the type locality.

REMARKS.—The absence of any bronze dorsal area immediately distinguishes this lotong from any other race of *P. obscura*. Its occurrence on Perhentian Island is interesting, as, so far, this is the only island on the east coast that is known to possess a member of the genus.

MACACA FASCICULARIS ARGENTIMEMBRA.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 116, 1911.

TYPE.—Adult male (skin and skull), No. 2,068/10, Selangor Museum, collected on Pulo Pinang, Great Redang Island, Trengganu, east coast of the Malay Peninsula, 4th September, 1910, by C. Boden Kloss. Original No. 3,815.

CHARACTERS.—A macaque of medium size differing from the mainland animal and from *Macaca letus* (Elliot)* of Tinggi and Tioman Islands, in the less annulated ochraceous upper surface which is greatly reduced in area, darker under fur, and also in the more silvery limbs and under-parts, and paler tail.

COLOUR.—Upper-parts mingled ochraceous and brownish black, the annulations indistinct and the dark element appearing rather as a wash or clouding than a speckle: base of fur, dark greyish brown. Colour of upper-parts confined to head and back and not extending to the sides. Outer surfaces of fore-limbs and upper-parts of thighs, frosted grey suffused with pale buff.

Entire under-parts with sides of body, entire lower-parts of thighs, inner sides of fore-limbs and sides of head, below and behind ears, pale whitish silvery.

Muzzle and sides of face clad with short greyish hairs; lateral facial fringes faintly sullied with buff; a fringe of black hairs above the forehead.

Hind-feet concolorous with legs, fore-feet like fore-limbs but lacking the faint buffy wash.

Outer surface of proximal half of tail greyish black, whole remaining portion silvery white like the abdomen.

SKULL AND TEETH.—Comparison of the skulls of macaques are of little value as the minor characters are not fixed and alter entirely with age. However, the supra-orbital ridges in the type are very high and projecting so that viewed laterally the nasals present a notably concave outline, very different from *M. letus*, where the outline is nearly straight; the muzzle is broad, the canines very heavy and the palate strongly arched, yet, owing to the horse-shoe shaped arrangement of the maxillary teeth, the breadth of the muzzle is least across the canines.

MEASUREMENTS.—Collector's external measurements of type: total length, 1,068; head to symphysis pubis, 490; tail vertebrae, 620; hind-foot, 185. Cranial measurements: greatest length, 118.3; posterior occipital extremity to nasal spine, 94.4; posterior occipital extremity to glabella, 78; gnathion to median upper edge of supra-orbital ridge, 62.4; gnathion to orbit, 41; orbit to posterior occipital extremity, 79.7; zygomatic breadth, 83; external biorbital breadth, 66; post-orbital constriction, 79; basal length, 81.5; palatal length, 41; palatal breadth at canine, 16.5; palatal breadth at m^1 , 22.5; palatal breadth at m^3 , 20; greatest breadth of rostrum below roots of zygomata, 40; maxillary tooth-row, excluding incisors, 37; mandibular tooth-row, excluding incisors, 44; greatest length of mandible, 82; height of mandible at condyle, 34.

SPECIMENS EXAMINED.—Two from Pulo Pinang and two others from Great Redang Island, 200 yards distant.

REMARKS.—This macaque is characterised by moderate size, by the reduced extent of the ochraceous area and by the silvery limbs and

* "Annals and Magazine of Natural History," Ser. 8, vol. iv., Sept., 1909, p. 255.

under-parts: an adult female illustrates these features far more emphatically than does the male chosen as type.

Measurements of adult Monkeys from the Trengganu Archipelago:

Name.	Locality.	S. M. No.	Sex.	Total length.	Head to symph. pubis.	Tail vertebrae.	Hind-foot.	Greatest cranial length.	Zygomantic breadth.	Height of mandible at condyle.	Maxillary tooth-row exclusive of incisors.
<i>Presbytes obscura styx. type</i>	East Perhentian Island ...	2061/10	Male	1,332	583	795	164	102	77	45.5	35.2
"	"	2062/10	"	1,330	580	790	171	104.2	80	42	34.3
"	"	2064/10	"	1,310	580	800	160	102	80.2	45.5	35
"	"	2065/10	"	1,336	572	734	164	97.5	75.5	39	35.5
"	"	2063/10	Female	1,297	568	778	166	97	75	44	32.6
"	"	2066/10	"	1,255	560	720	159	94.5	73	39.5	32.3
<i>Macaca fascicularis argentimembra. type</i>	Great Redang Island ...	2068/10	Male	1,063	490	620	135	113.3	83	34	37
"	"	2070/10	"	1,055	470	630	131	107	73	29	36.5
"	"	2069/10	Female	945	435	550	118	96	67	24	33

PTEROPIUS HYPOMELANUS LEPIDUS, MILLER.

Great Redang Island. 5 ♂; 4 ♀.

Lantinga Island. 1 ♀.

The series of ten specimens agree, on the whole, with a series of eight skins from Tioman Island identified by Thomas* as *Pteropus hypomelanus lepidus*, Miller† (type locality, Tambelan Islands, Southern China Sea), and they may be referred to that race which they also approach in size.

Their colour is variable and ranges from individuals with dark chestnut shoulders, dark smoky-grey backs and blackish chestnut under-parts to others with tawny shoulders, pale fulvous-fawn backs (pale burnt umber) and broccoli-brown under-parts. The Lantinga Island example best illustrates most strongly the latter type of colouration.

One specimen (2059/10 ♀), a tawny-shouldered, brown-backed animal, only differs in colour from *P. h. robinsoni*, Andersen‡ (type locality, Sembilan Islands, Straits of Malacca), in being slightly paler on the extreme sides of the abdomen and thus stands somewhat apart from the others.

The only specimen of a Fruit-Bat previously known from Great Redang Island was recorded by Bonhote|| under the name of *P. nicobaricus*, Fitzinger. None of the present specimens can be identified in any way with that species.

Perhentian Islands. 4 ♂; 3 ♀.

On arranging the animals from both this island and Great Redang in a series with those having the darkest shoulders and backs at one extreme and the lightest animals at the other, it is seen that in the one position there will be the bats from the Perhentian Islands and in the other the individuals from Great Redang with the specimen from Lantinga, brightest of all, at the extremity: there is a little overlapping in the centre.

Of the Perhentian specimens three are so dark as to approach in colour *P. nicobaricus*, but are much smaller: three others closely resemble *P. h. robinsoni*, but the shoulders and under-parts are a trifle darker and the backs a trifle paler. The final specimen (2049/10 ♂) nearly resembles Redang individuals in colour above but has the furry portion of the back greatly reduced in width (average breadth 35mm.).

* "Journal of the Federated Malay States Museums," vol. ii, September, 1908, p. 102.

† "Proceedings of the Washington Academy of Sciences," vol. ii, August, 1900, p. 237.

‡ "Annals and Magazine of Natural History," Ser. 8, vol. iv, December, 1900, p. 334.

|| "Proceedings of the Zoological Society," 1900, p. 875.

(See also post p. 212)

CYNOPTERUS ANGULATUS, MILLER.

Great Redang Island. 4♂; 3♀.

Measurements made on five adult individuals from the island show them to be slightly but distinctly smaller than the type series.

In the description of the type* the upper molar is stated to be about equal to the third premolar but with a slightly narrower crown: in the present series, however, and in all other *Cynopteri* referable to *C. angulatus* that I have seen, it is both considerably smaller and sub-triangular in shape, narrowing posteriorly.

Males from Great Redang Island have the head olivaceous brown, nape, ochraceous, sides of neck and shoulders, tawny, back, brown washed with raw umber: below, the throat, chest and sides of body are ochraceous and the middle of the abdomen greyish olivaceous-brown. Females are paler than males throughout, lacking the ochraceous tails which are replaced to a certain extent by buff.

C. angulatus connects *C. sphinx*, Vahl, of Burmah and India, with *C. montanoi*, Robin., of the Malay Archipelago. The ears of the latter, however, show no indication of the whitish border (*vide* Miller, "Proc. U. S. Nat. Mus.," xxvi., p. 474), so marked in *C. sphinx* and in the present species, and *C. angulatus* should be regarded therefore as a southern race of the Indian animal. The skull and teeth more nearly resemble those of the latter than they do those of the more robust and broader-headed *C. montanoi*. There is also no trace of a sagittal crest.

Measurements of adult *Cynopterus angulatus* from Great Redang Island:

S. M. number ...	2073/10	2074/10	2075/10	2076/10	2675/10	Average.
Sex	♀	♂	♂	♂	♂	
Head and body ...	95	98	93	94	94	94.8
Tail ...	10	9	9	12	9	9.8
Ear ...	16	16	16.5	16.5	16	16.2
Forearm ...	68	63	65.5	63	65	64.9
Second finger ...	112	115	108	113	110	111.6
Skull: greatest length ...	29.1	30	29.8	29.5	...	29.6
Interorbital breadth ...	7.2	5.6	6.0	6.5	...	6.3
Zygomatic breadth ...	19.5	19.3	19.5	19.4	...	19.4
Basal length ...	25.7	26	26	25.2	...	25.7
Palatilar length ...	13.5	14.5	14	13.5	...	13.9
Palatal breadth at molar ...	7	6	6	5.9	...	6.2
Uppertooth-row excluding incisors ...	9	9.5	9.2	8.9	...	9.1
Lowertooth-row excluding incisors ...	10.5	11	10.5	10	...	10.5

* "Proceedings of the Academy of Natural Sciences of Philadelphia," 1898, p. 316.

RHINOLOPHUS AFFINIS SUPERANS, ANDERSEN.

Great Redang Island. 3♂. (One skin and two spirit specimens).

Three very uniform Bats taken on Great Redang Island appear to be members of this race though the maximum dimensions of the series are generally a little smaller than the *minimum* measurements of a series of individuals given with the description of the type,* and though they are in all respects smaller animals than examples from the mainland.

MEASUREMENTS.

	Minimum.	S.M. 2676/10.	S.M. 2677/10.	S.M. 2072/10.
Sex ... ..	...	♂	♂	♂
Head and body ... ..	...	58	58	57
Ears, length	20.2	19.6	19	19.5
„ breadth	14.8	14.8	14.8	14.5
Nose-leaves, total length ...	14.8	14.8		
„ breadth of horse-shoe ...	9.8	9.8		
Forearm	51.2	49	49	47.5
3rd metacarpal	36	35.5	35.8	34
III ¹	14.6	14.5	14	13.7
III ²	23.8	23.3	23.8	22.5
4th metacarpal	36.8	36.5	36.5	35
IV ¹	10	9.5	9.5	9
IV ²	14	13	13.5	13
5th metacarpal	37.7	36.5	36.5	35.5
V ¹	11.2	10.5	10.4	10
V ²	12.2	12	11	11
Tail	21.5	22.6	24	22.5
Lower leg	25	23	23.2	22
Foot, with claws	11.1	12.3	12	12.3
Skull, total length † ...	22.8	...	...	21
„ mastoid width	10.9	...	10.3	10
„ width of brain-case ...	9.8	...	9.6	9.7
„ zygomatic width	11.3	...	11	10.8
„ supra-orbital length ‡ ...	5.7	...	6	6
„ width of nasal swellings ...	6.2	...	6	5.8
Mandible length	15.8	...	...	14.2
Upper teeth §	9	...	...	8
Lower teeth §	9.7	...	...	8.9

EMBALLONURA ANAMBENSIS, MILLER.

Great Redang Island. 1♂; 1♀ in alcohol. *

Above dark vandyke-brown, below much paler: the hair everywhere whitish at base, markedly so above in contrast with the dark fur, but less distinctly so below.

* "Proceedings of the Zoological Society," 1905, vol. ii, p. 106.

† To front of canines.

‡ Front of nasal swellings to junction of supra-orbital and sagittal crests.

§ Excluding incisors.

On account of the slenderness of their skulls, these examples and others from Tionian Island should, I think, be referred to the race of the Anambas Islands* rather than to the mainland form *E. peninsularis*, Miller, † which possesses, relatively to the other dimensions of the skull, a decidedly broader rostrum and brain-case.

Dimensions of an adult female: head and body, 50; tail, 14; fore-arm, 44; hind-foot, 7.2; lower leg, 16; thumb, 8; second finger, 36.5, third finger [39.5 + 12.5 + 19 (chord of III²)], 71; fourth finger [32.5 + 9.5 + 6] 48; fifth finger [30 + 11 + 5], 46; Cranial measurements: greatest length, 14.4; condylo-basal length, 13.1; basal length, 12; zygomatic breadth, 8.4; greatest anteorbital breadth 5.7; least interorbital breadth, 3; cranial length, 9.2; cranial breadth, 7; breadth of palate between posterior molars, 3; palatal length, 4.4; upper molar excluding incisors, 5.1; lower molar row excluding incisors, 5.5; greatest length of mandible, 9.8. (S.M. No. 2678/10).

GALEOPTERUS PUMILUS, MILLER.

Perhentian Islands. 3 adult ♂.

2 " ♀.

2 immature ♀.

General colour impression of males: above is a belline, shoulders darker and browner; sides and back of neck and head, and to a less extent the rump, smoky grey; top of head is a belline; chin and muzzle to the eyes, blackish; fore-feet, blackish, spotted with buff; a tawny patch on the upper part of thighs and fore-limbs; the parachute washed pale buffy: the whole upper surface marbled and streaked with brownish-black and spotted with creamy buff; an elongate white patch below the eye which is tinged with blackish; the base of each individual hair, grey, the central portion buffy or white. Below pale pinkish is a belline, the chest and abdomen darker with grey bases to the hairs; parachute somewhat ochraceous; uropatagium dark tawny-brown females: above, smoky grey, throat and muzzle, blackish; fore-feet, blackish spotted with cream-buff, a large white patch on the shoulders and a smaller on the posterior aspect of the thighs; sides of body and parachute washed with buff white; a white patch below the eye: the whole upper surface mingled dull black and whitish; the base of each individual hair, grey, the central portion buff or buff-white, extreme edge of uropatagium tawny. Below as in males.

The males agree in colour with topotypes of *G. pumilus*‡: the females resemble females of *G. peninsulae*, Thomas,§ but are greyer above and brighter below.

* "Proceedings of the Academy of Natural Sciences of Philadelphia," 1898, p. 323.

† "Proceedings of the Washington Academy of Sciences," vol. ii, Aug., 1900, p. 236.

‡ "Smithsonian Miscellaneous Collections," vol. xlv., Nov., 1903, p. 46.

§ "Annals and Magazine of Natural History," ser. 8, vol. ii., 1906, p. 303.

The following collector's external measurements of specimens from the neighbouring island Aor are available :

	♀ *	♀.	♀.	♀.	♂.
Head and body	385	383	330	384	327
Tail	240	213	223	211	180
Hind-foot	54†	54	53	49	46
Ear	16†	17	16	17	16

It will be seen from the table below that some discrepancy exists between the foot and ear dimensions of the two series, but these measurements taken on the dried skins of the last two individuals are larger than those given by the collector.

Cranial measurements of the two adult females, however, are practically those of the type of *G. aoris*, Miller, save that in both instances the figures for mandible and mandibular tooth-row are somewhat less.

Selangor Museum No. ...	2321/10	2322/10	2324/10	2320/10	Type of <i>G. aoris</i> .
Sex	♂	♂	♀	♀	♀
Head and body	312	323	353	358	385
Tail	188	203	230	220	240
Hind-foot	54	54	59	59	54 †
Ear	20	19	21	20.5	16 †
Skull, greatest length ...	63	63	66.3	68	67
Condyllo-basal " ...	59.5	59.9	63	64	63
Basal length	56	56	59	59.6	58
Lateral palatal length ...	29.2	30	30.1	30.5	30.4
Palatal width at front of 1st incisor	11.2	11.2	12	12.5	12.4
Palatal width at space between canine and 1st premolar	17	19.8	20.7	...	20.4
Distance between inner edges of posterior molar	12.8	13.8	...	...	15
Least distance from orbit to anterior nares ...	22.3	22.4	23	24.6	23
Zygomatic breadth ...	36	38	40	...	40
Greatest orbital breadth ...	40.9	42	43	40.9	40.3
Least interorbital breadth	16	15.8	17	15.3	17.4
Mastoid breadth	28	28.6	30.1	...	30
Mandible	47.6	46	45	49	50
Depth of mandible between canine and 1st premolar	5.4	6	5.5	5.2	6.6
Depth of mandible through coronoid process ...	21	17.5	18.5	20	20.4
Maxillary tooth-row ...	80.1	81.8	81	81.1	81.6
Mandibular tooth-row ...	81	81.8	80	82	83.4

* Type of *G. aoris*, Miller.

† From dried skin.

(Since specimens from the Perhentians, Pulau Aor and the Langkawi group appear to be inseparable I have used the name applied to animals from the latter group as it has priority over *G. aoris*).

TUPAIA (FERRUGINEA) OBSCURA.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 116, 1911.

TYPE.—Adult male (skin and skull), No. 2279/10, Selangor Museum, collected on Great Redang Island, off Trengganu, east coast of the Malay Peninsula, 2nd September, 1910, by C. Boden Kloss. Original No. 3708.

CHARACTERS.—Closely resembles *T. belangeri*, Wagl., of Burmah and Tenasserim, but is smaller, the upper surface is slightly more tawny, the buff shoulder-stripes much larger and more distinct and the under-surface of the tail yellower. From *T. f. wilkinsoni*, Rob. & Kl.,* of Trang, it is immediately separable by its less rufous rump, paler under-surface, and paler, less blackish, tail. The latter also is alone sufficient to distinguish it from the darker and shorter-tailed *T. lacernata*, T. & W.,† of the Langkawi and Terutau group.

COLOUR.—Entire upper-parts a speckle of buff and black slightly washed with tawny on rump and thighs. Below, cream-buff tinged lemon yellow on throat and along median line of abdomen: the margins of abdomen like sides but paler and not annulated. Sides of neck and behind ear, pale buff, this colour extending over the upper shoulder in the form of a stripe. Tail above a grizzle of buff-white and black not concolourous with the rump, but blacker and less tawny; below the yellow predominates, the short hairs clothing the vertebrae being pure pale buff-white.

SKULL AND TEETH.—Viewed from above the skull exactly resembles that of *T. belangeri* (as figured by Anderson, *Zool. Researches*, vol. ii, plate 7) save that the extremity of the rostrum is a little broader. Viewed laterally the interorbital region is depressed and the outline of the cranium more curved, the entire occipital region being bent downwards. Compared with skulls of the *ferruginea* group from the Peninsula and islands south of Lower Tenasserim it is smaller, having the rostrum considerably reduced in length, but there is no appreciable difference in that portion of the skull posterior to, and including the orbits. The teeth differ merely in size.

MEASUREMENTS.—Collector's external measurements of type: head and body, 178; tail, 167; hind-foot, 40; ear, 15. Cranial measurements: greatest length, 48; tip of nasals to posterior extremity of skull, 45.4; basal length, 42; palatal length, 25.8; lachrymal notch to tip of premaxillary, 20.6; breadth of rostrum at middle of diastema, 7; least interorbital breadth, 14; greatest cranial breadth, 19.1; zygomatic breadth, 25.8.

SPECIMENS EXAMINED.—Sixteen, all from the type locality.

* "Journal of the Federated Malay States Museums," vol. iv, p. 173, 1911.

† "Annals and Magazine of Natural History," ser. 8, vol. iv., Dec. 1909, p. 535.

REMARKS.—This species is very different from *Tupaia ferruginea*, Raff., *T. pulonis*, Miller,* and *T. sordida*, Miller,† all members of the *ferruginea* group.

In some examples the tail is much greyer than the back but never attains the dark colour of the other Peninsular tree-shrews. The type specimen has almost entirely renewed its coat but traces of the old pelage are to be seen on the back in the form of mingled ochraceous and black patches, contrasting with the buffy annulations of the fresh hairs: the lemon wash on the lower-surface occurs in a few individuals only, the predominating colour below being cream-buff to deep buff.

The short skull and dull pelage of this animal ally it with the distant *T. belangeri* of Burmah and markedly distinguish it from *T. ferruginea*, its nearest geographical neighbour.

TUPAIA (FERRUGINEA) LONGICAUDA.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 117, 1911.

TYPE.—Adult female (skin and skull), No. 2295/10, Selangor Museum, collected on East Perhentian Island, off Trengganu, east coast of the Malay Peninsula, 8th September, 1910, by C. Boden Kloss. Original No. 3517.

CHARACTERS.—Resembles *T. ferruginea* from Singapore and the Malay Peninsula, but has the tail almost always longer than head and body and therefore much longer than the tail of *T. ferruginea*: further, differs in being lighter and less rufous above and distinctly yellower below, lacking the greyish tone of *T. ferruginea*, in having the feet and tail paler, the latter being very yellow below and above buff and black, instead of buff-white and black and in the spread of the buffy colour of the throat up the sides of the neck and behind the ear to meet the shoulder-stripe.

In the colour of its dorsal pelage it closely resembles *T. f. wilkinsoni* from Trang, but in other respects differs from this as it does from Singapore individuals.

From *T. sordida*, Miller, of Tioman Island, it differs in being paler above through possessing less of the black element, in having the under-parts and under-surface of tail buffy instead of greyish and also in longer tail and larger shoulder-stripe.

COLOUR.—Top of muzzle and head, fore- and hind-feet, finely speckled black and buff, the fore-feet rather lighter; remaining upper-parts mingled black and ochraceous but paler on the sides, the rump tinged with tawny but becoming blackish above the base of the tail. Below, buff-white to buff, the margins of the abdomen similar in colour to the sides of the body but much paler and not annulated. From the throat the buff colour extends over the sides of the neck to behind the ears and forms a well-defined stripe on the upper parts of the shoulders. Tail a grizzle of black and pale buff, much paler below, where the short hairs clothing the vertebrae are pure pale buff.

* "Smithsonian Miscellaneous Collections," No. 46, Nov. 1903, p. 56.

† "Proceedings of the Washington Academy of Sciences," vol. ii, Aug. 1900, p. 231.

SKULL AND TEETH.—The skulls of *T. longicauda* are a trifle smaller in all dimensions than those of *T. ferruginea*, but the only constant difference in form that I can detect is that the palatal foramina are notably broader in the former: this difference is, however, so marked and uniform that the skulls of the two species are immediately separable by it alone. The teeth are a little smaller: the reduction is most perceptible in the posterior upper molar.

MEASUREMENTS.—Collector's external measurements of type: head and body, 178; tail, 192; hind-foot, 44; ear, 16. Cranial measurements: greatest length, 51.7; basal length, 44.7; tip of nasals to posterior extremity of skull, 48.2; palatal length, 27; lachrymal notch to tip of premaxillary, 22.1; breadth of rostrum at middle of diastema, 6.5; least interorbital breadth, 14.4; greatest cranial breadth, 19.5; zygomatic breadth, 26.2; breadth of combined palatal foramina, 4.

SPECIMENS EXAMINED.—Twenty-four from East and one from West Perhentian Island.

REMARKS.—The black colour on the rump possessed by the type is frequently absent, the under-parts vary from buffy-white to lemon yellow, and the short hair, clothing the lower side of the tail, from buffy-white to pale ochraceous.

The long tail, which generally exceeds the length of head and body, renders the species conspicuous. It needs no comparison with *T. lacernata*, which is a small member of the same sub-group, nor with the very different *T. belangeri* and *T. obscura*; with exception of the tail it is in all dimensions, both body and cranial, a trifle smaller than the typical form inhabiting Singapore.*

I have not been able to compare *T. longicauda* with specimens of *T. pulonis*, Miller, from Aor Island, founded on two examples only. The latter race is said to be larger than *T. ferruginea*, but the cranial measurements of the type are considerably less than those of many Singapore animals, though the collector's external measurements are, as Miller states, considerably larger. As the tail is shorter than the length of head and body, the colour of the back that of *T. ferruginea*, and the rostrum relatively broader and more robust than the latter, the Perhentian Island animal does not appear to need close comparison with it.

Of the numerous species of *Tupaia* which I have collected personally, *T. longicauda* with *T. nicobarica*, Zelebor, and its subspecies *T. (N.) surda*, Miller, † alone are truly arboreal in habit. As a rule the so-called "tree-shrews" are seen and trapped on the ground where they live and feed, or, at most, climb occasionally into low bushes: in them the tail is shorter than the head and body length. The above-named animals, which are met with in high trees and have the habits of squirrels, all possess a tail that is considerably longer than the length of head and body.

* Animals from the adjacent mainland of Trengganu are typical *ferruginea* but I have compared *T. longicauda* with the topotypes as a much larger series of the latter is available.

† "Proceedings of the United States National Museum," vol. xxiv, 1902, p. 774.

Measurements of adult *Tupaia* from the Peninsular Region :

Name.	Locality.	N. M. No.	Sex.	Head and body.	Tail.	Hind-foot.	Ear.	Greatest length of skull.	Tip of muzzle to alary notch.	Interorbital breadth.	Zygomatic.
<i>Tupaia obscura, type</i>	Great Island	2279/10	Male	173	167	40	15	48	20.6	14	25.8
"	"	2282/10	"	167	163	38	14	47.6	20.8	14.1	25
"	"	2283/10	"	176	174	40	14	49	20.6	14.2	24.7
"	"	2284/10	Female	171	165	38	15	48	20.4	14	24.3
"	"	2285/10	Male	173	172	39	14.5	47.7	20.8	14.1	25.6
"	"	2286/10	"	170	175	39.5	14.3	48.8	21	14	25.5
"	"	2287/10	Female	174	179	39.5	14	48.3	20.5	14	24.3
"	"	2288/10	"	165	170	39	15	48.3	20.7	14.3	24.8
"	"	2290/10	"	172	168	38.5	14.5	48.6	20.6	14	24
"	"	2292/10	"	160	175	38	15.5	48.6	21	14.3	24.6
"	"	2293/10	"	166	162	38.5	14	47.8	20	14.2	24
"	"	2294/10	"	166	164	38	14	47.4	19.8	14.2	24.3

<i>average</i>	"	...	...	...	169.4	169.5	38.8	14.5	48.2	20.6	14.1	24.6
<i>Tupaia longicauda</i> , type ...	East Island	...	2295/10	Female	178	192	44	16	51	7	22.1	14.4
"	"	"	2302/10	"	179	181	43	16	51			26.2
"	"	"	2303/10	Male	171	189	43	16	52		22.4	25.4
"	"	"	2304/10	"	179	176	43	15	51.1		22	26
"	"	"	2307/10	"	173	190	44	15.5	52		22.3	25.2
"	"	"	2308/10	Female	182	185	44	16	51	5	22	25.4
"	"	"	2311/10	Male	185	195	44	16.5	52	1	22.2	25.5
"	"	"	2314/10	Female	178	178	42	16	50.8		21.8	26
"	"	"	2315/10	"	190	184	44	16	52.2		22.4	25
"	"	"	2316/10	"	167	173	42	15.5	50	6	21	26
"	"	"	2317/10	Male	182	186	43.5	15.5	51		22.1	25.2
"	"	"	2318/10	Female	178	182	42.5	16	51		21.8	25.6
<i>average*</i>	"	"	177.5	185.6	43.5	15.9	51	6	22.1	25.6
<i>Tupaia ferruginea</i> , topotypes	Singapore Island											
<i>average†</i>	...	...	...	...	163.1	155.8	41.7	15	1	52	3	25.6

Of external dimensions of 24 adult specimens.

+ (of external dimensions of 30 adult specimens.

CROCIDURA MAJOR.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 117, 1911.

TYPE.—Adult male (skin and skull), No. 2578/10, Selangor Museum, collected on Great Redang Island, off Trengganu, east coast of the Malay Peninsula, 31st August, 1910, by C. Boden Kloss. Original No. 3369.

CHARACTERS.—A large member of the sub-genus *Crocidura*, larger than *C. fuliginosa* and darker above. Approaching in size *C. lepidura*, Lyon,* of Eastern Sumatra, though with a relatively smaller foot, but larger than any other Sumatran or Indian form of the section. About the same size as the Bornean *C. baluensis*, Thos.,† but with smaller tail and foot, and less dense fur.

COLOUR.—Above, dark ashy-brown, the bases of the hairs dark-grey, each hair about 6 mm. long; below, ashy-brown to ashy-grey, palest on the throat, the bases of the hairs grey, rather lighter than the bases of the dorsal hairs; sides of body and abdomen very slightly frosted by whitish tips to the hairs; the lateral glands of the males concealed by patches of adpressed hairs (9 × 4 mm.) ashy-brown throughout; ears clad with very fine hairs; feet dark above, the inner edges paler, scantily covered with short dark hairs; the terminal phalanges of the hind-feet with a few white hairs overhanging the nails; tail finely annulated, dark-brown above paler below, clad with minute adpressed bristles throughout, the basal half with a few long pale hairs; vibrissæ with white tips and black bases, the longest about 20 mm.

SKULL AND TEETH.—I can detect no difference other than that of size between those of the Redang Island shrew and the skull and teeth of others from the Peninsula mainland.

MEASUREMENTS.—For measurements of type and other specimens obtained see table below:

SPECIMENS EXAMINED.—Three (one in alcohol), all from the type locality.

REMARKS.—There are no traces of lateral scent glands in the single female obtained. This island shrew is exceeded in size amongst known Indo-Malayan species of the sub-genus by *C. lepidura* and approached by *C. baluensis* only. It is considerably larger than the largest *Crocidura* inhabiting the Malay Peninsula, which is about the same size as *C. weberi*, Jentink,‡ from Singkarak (near Padang), Sumatra.

* "Proceedings of the United States Nat. Mus.," vol. xxxiv., 1908, p. 662.

† "Annals and Magazine of Natural History," ser. 7, vol. ii., Sept. 1898, p. 247.

‡ Weber, "Zool. Ergebn. Reis. Niederland Ost-Indie," 1890, i., p. 124.

Measurements of *Crocidura major*:

Selangor Museum No.	2572/10	2573/10	2679/10	
Sex	♂	♂ type	♀	(♀)
Head and body	95	97	98	(80)
Tail	69	68	72	(53)
Hind-foot	16	16	15.5	(13)
Ear	10.5	10	10.5	(9)
Cranium, greatest length (excluding incisors)	23.1	23	22.3	(21.1)
„ basal length ...	21	20.9	20.4	(19.1)
„ palatal „ ...	10.7	10	10	(9.3)
„ lachrymal breadth of rostrum ...	4.7	4.6	4.7	(4.1)
„ greatest ante-orbital breadth ...	8.1	7.8	8	(6.4)
„ „ cranial breadth...	10.7	10.6	10.5	(9.3)
Entire maxillary tooth-row (including incisors)	11.1	10.8	10.5	(9.9)
„ mandibular „ „	10.2	9.9	9.2	(9.2)

SCIURUS (VITTATUS) SCOTTII.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 117, 1911.

TYPE.—Adult female (skin and skull), No. 2078/10, Selangor Museum, collected on Bedung Island, off Trengganu, east coast of the Malay Peninsula, 29th August, 1910, by C. Boden Kloss. Original No. 3860.

CHARACTERS.—Like *Sciurus miniatus*, Miller,† but smaller, also paler and duller above, the yellow element being pale buff rather than ochraceous-buff; below the rufous colour extending farther up the throat and everywhere conspicuously sown with white hairs; dark lateral stripe reduced and less intense, the buff stripe narrower and paler.

COLOUR.—Upper-parts a speckle of medium buff and black, the speckling being absent or much finer on sides of head and neck, chin, fore-limbs and hind-feet, where the black element undergoes reduction and the buff is brighter; an ochraceous ring round the eyes and the ears tinged with that colour.

Under-parts bright rufous (burnt sienna), extending beyond the whorl of hair on the throat almost to the lips and everywhere sprinkled with white hairs.

Upper lateral stripe cream-buff and narrow (4.5 mm); the lower stripe dull black, tipped and annulated with the rufous of the abdomen, with which colour it is gradually overlaid, the pure black portion extremely narrow and adjacent to the buff stripe only.

* Measurements in parentheses those of an adult *Crocidura* from Gunong Semanggol, Larut, Perak. (S.M. No. 2680/10).

† "Proceedings of the Washington Academy of Sciences," vol. ii., July, 1900, p. 79.

Tail coarsely annulated with black and pale buff, paler than the back, the annulations forming obscure black bands on the upper-surface; under-surface much yellower and less black. A rufous pencil covers the distal half of the lower surface but is not so extensive above where its hairs are tipped and annulated with black.

SKULL AND TEETH.—As compared with *S. miniatus*, Miller, the skull of *S. scottii* is very much smaller and the rostrum is relatively shorter and blunter. The nasals do not, as is the case with the mainland race, frequently have their posterior terminations (which are serrated, and not V-shaped in combination) markedly in front of those of the premaxillaries but both are practically coterminous, thus their median length is relatively greater and they are often actually broader posteriorly. Viewed from above the occipital region is more swollen and three distinct protruberances are visible on the walls of the supraoccipital bone where a central one only can be detected from the same point of view in *miniatus*. The junctions of the lateral and posterior edges of the frontal bone are subangular. The teeth only differ in size.

MEASUREMENTS.—Collector's external measurements of type: head and body, 187; tail, 180; hind-foot, 44; ear, 17. Cranial measurements: greatest length, 45.1; basal length, 38.3; palatal length, 20.6; diastema 10.3; maxillary tooth-row, 8.9; median length of nasals, 12.6; greatest breadth of combined nasals, 6; interorbital breadth, 16.8; cranial breadth above roots of zygomata, 21; zygomatic breadth, 27.7.

SPECIMENS EXAMINED.—Eight, all from the type locality.

REMARKS.—The small size of this squirrel, together with its lighter upper-parts reduced lateral stripe and white-sprinkled abdomen, strongly differentiates it from its relative occupying the adjacent district of Trengganu and the greater part of the Peninsula.

It is named in honour of Mr. W. D. Scott, British Agent, Trengganu, whose assistance greatly facilitated and largely made possible my visit to the islands of the Trengganu Archipelago.

SCIURUS (VITTATUS) PLASTICUS.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 117, 1911.

TYPE.—Adult female (skin and skull), No. 2159/10, Selangor Museum. collected on Great Redang Island, off Trengganu, east coast of the Malay Peninsula, 1st September, 1910, by C. Boden Kloss. Original No. 3899.

CHARACTERS.—Like *Sciurus miniatus* but smaller, with paler upper-parts and tail and narrower black lateral stripe. Like *S. scottii* but with the buff element greater in quantity above and the dark lateral stripe more clearly defined, the rufous of the under-parts not extending so near the lips, the white hairs practically absent on the abdomen and the caudal pencil reduced in extent.

COLOUR.—Upper-parts a speckle of medium buff and black, the former in excess, the speckling being absent or very fine on sides of head and neck, chin, fore-limbs and hind-feet, which appear greyish buff: an obsolete ochraceous ring round the eye.

Under-parts bright rufous (burnt sienna), this colour extending but little beyond the whorl of hair on the throat.

Upper lateral stripe cream-buff (7 mm. wide), the lower, stripe black, slightly grizzled with ochraceous and narrower than the other.

Tail coarsely annulated black and pale buff, paler than the back, the annulations forming obscure cross-bars on the upper-surface: the under-surface much more buffy than black. A rufous pencil extends distally along one-third of the under-surface, but is reduced above where its hairs are tipped and annulated with black.

SKULL AND TEETH.—The skull of *S. plasticus* is in general a small form of *S. miniatu*s, with relatively longer nasals between which and the premaxillaries intrude wedges of frontal bone. The posterior termination of the combined nasals is V-shaped, so that their medium length is the minimum nasal length. Proportionately a much greater extent of the premaxillaries is visible on the upper surface. Generally the lateral and posterior edges of the frontal form a curve at their points of junction. The skull is larger than that of *S. scottii*, with a markedly longer rostrum: the teeth scarcely differ.

MEASUREMENTS.—Collector's external measurements of type: head and body, 183; tail, 185; hind-foot, 43; ear, 16.5. Cranial measurements: greatest length, 46.2; basal length, 40; palatal length, 22; diastema, 10.6; maxillary tooth-row, 8.5; median length of nasals, 13; greatest breadth of combined nasals, 7; inter-orbital breadth, 17.2; cranial breadth above roots of zygomata, 21; zygomatic breadth, 28.

SPECIMENS EXAMINED.—Thirteen, all from the type locality.

MUTATION-1.

EXAMPLE.—Adult female (skin and skull), No. 2149/10, Selangor Museum. Original No. 3389. Other details as above.

CHARACTERS AND COLOUR.—Like the type but the upper-parts throughout brighter, the yellow element being buff and in excess of the black; below, the rufous colour slightly less intense; pale lateral stripe similar, but the dark stripe much reduced and strongly grizzled, almost obscured by the rufous ochraceous tips of its hairs.

MEASUREMENTS.—For measurements *see* p. 204.

SPECIMENS WITH THIS APPEARANCE.—Ten, all from the type locality.

MUTATION-2.

EXAMPLE.—Adult female (skin and skull), No. 2146/10, Selangor Museum, collected 3rd September, 1910. Original No. 3691. Other details as above.

CHARACTER AND COLOUR.—Above mingled black and intense buff, the latter so greatly in excess as to produce a general golden effect the upper-surface of head ochraceous-buff, brightest on the occiput. Ears, ring round eyes, fore- and hind-feet ochraceous; cheeks, chin and sides of head and neck clear buff; under-parts rufous; lateral stripe pale buff (5 mm. wide), dark lateral stripe entirely absent; tail above

like back but more coarsely annulated, the distal third rufous-tipped and annulated with black; below, intense buff, the black annulations almost absent, the distal half clear rufous.

MEASUREMENTS.—For measurements see p. 204.

SPECIMENS WITH THIS APPEARANCE.—Three, all from the type locality.

REMARKS.—The squirrel of Great Redang Island is so extremely variable that, but for a long range of intermediate examples, it would be impossible to believe individuals at either extreme of the series to be of the same race and locality. A specimen most resembling forms prevailing throughout the Peninsula area has been chosen for the type, but at the same time, having regard to the unusual conditions of the animal, it has been thought desirable to define the appearance of others.

These are at present only stages of evolution, but—on the principle that when an animal, as a whole, commences to show in one direction all degrees of variation from the normal it will, if undisturbed and uninterrupted, eventually assume altogether the appearance of the extreme variation—the most extreme form will at some future day be typical of the race. In *S. proteus* of the Perhentian Islands, which follows, the turning point has been already attained and the majority of the animals there are now of the abnormal pattern.

It is open, nevertheless, to choose one of the other forms described for the typical animal, since, however, the case be regarded, it is an incontrovertable fact that the Redang Island squirrel is now a very distinct race and is on the way to become still more so.

The different animals are, however, only varieties, and the case of the island species is not analogous with that of *S. vittatus* in the Peninsula, where there occur three forms, *S. miniatu*s, Miller, *S. peninsularis*, Miller,* and *S. subluteus*, T. & W., which, although they overlap and mingle on the borders of their distribution, are yet good geographical races.

The appearance of the extreme variety of this squirrel may be explained by erythrism, but in no other member of the *vittatus* group has this process been carried so far as to have brought about the complete disappearance of the dark lateral stripe. Save in East Perhentian, where the results of variation are equally marked, I do not think any other island so small can be cited in which a single race of squirrel exhibits so large a range of pattern and colouration.

SCIURUS (VITTATUS) PERHENTIANI.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 118, 1911.

TYPE.—Adult male (skin and skull), No. 2,172/10, Selangor Museum, collected on West Perhentian Island, off Trengganu, east

* It is unfortunate that this name has been applied to the race it represents, for the dominant Peninsular representative of *S. vittatus* is *S. miniatu*s.

coast of the Malay Peninsula, 11th September, 1910, by C. Boden Kloss. Original No. 8609.

CHARACTERS.—Like *S. miniatus* but smaller and paler throughout, owing to the yellow element being greater in quantity and of a lighter buff while the annulations are much coarser; rufous of abdomen and tail slightly less intense, the under-surface of tail yellower and the pencil reduced in extent; the pale lateral stripe broader and of a deeper buff, and the dark stripe, though equally broad, a less clear black.

Like *S. scottii* and *S. plasticus* but a little larger; the buff of the upper-surface deeper and the tail yellower; the pale lateral stripe broader and deeper in tint, the dark lateral stripe blacker and more defined than in *S. scottii* and broader and less obscured than in *S. plasticus*.

COLOUR.—Upper-parts a coarse speckle of buff and black: the speckling being much reduced or absent on top of muzzle, sides of head and neck, chin, fore-limbs and hind-feet which are a dull buff; an ochraceous buff ring round the eyes.

Under-parts tawny rufous, extending but little beyond the whorl of hair on the throat.

Upper lateral stripe medium-buff (10 mm. wide), the lower stripe black (9 mm. wide), slightly grizzled with ochraceous and tawny.

Tail coarsely annulated with black and medium buff, paler than the back, the annulations forming obscure broad bands on the upper-surface: the under-surface much yellower and less black. A rufous pencil extends along one-third the lower side, but is much reduced on the upper-surface where its hairs are tipped and annulated with black.

SKULL AND TEETH.—Like *S. plasticus* in breadth but longer, with the combined nasals broader anteriorly, while posteriorly the termination is sometimes V-shaped, sometimes irregular; in the latter character resembling *S. miniatus*, but the nasals are broader anteriorly and the skull is smaller; the lateral and posterior edges of the frontal bone form a marked angle at their points of junction and the bone extends further behind the supra-orbital processes than is the case with *S. plasticus*.

No detailed comparison is needed with the smaller short-nosed and relatively broader skull of *S. scottii*.

MEASUREMENTS.—Collector's external measurements of type: head and body, 188; tail, 172; hind-foot, 48.5; ear, 16.5. Cranial measurements: greatest length, 47.3; basal length, 40.9; palatal length, 23; diastema, 11.2; maxillary tooth-row, 9; median length of nasals, 14.0; greatest breadth of combined nasals, 7.2; inter-orbital breadth, 17.2; cranial breadth above roots of zygomatics, 20.8; zygomatic breadth, 28.2.

SPECIMENS EXAMINED.—Twenty-nine, all from the type locality.

REMARKS.—Its slightly smaller size and paler colouring sufficiently separate this race from the mainland animal, while differences in size and colour of the upper-parts, and the more marked lateral stripes, distinguish it from the other allied forms of the Trengganu Archipelago.

SCIURUS (VITTATUS) PROTEUS.

Kloss, *Ann. and Mag. Nat. Hist.* (8) vii., p. 118, 1911.

TYPE.—Adult male (skin and skull), No. 2094/10, Selangor Museum, collected on East Perhentian Island, off Trengganu, east coast of the Malay Peninsula, 18th September, 1910, by C. Boden Kloss. Original No. 3645.

CHARACTERS.—Smaller than *S. miniatus*; differs from *S. perhentiani* in being much paler above, while below the rufous is replaced by buff; the dark lateral stripe much obscured by the buff tips of the hairs.

Differs from *S. lutescens*,* Miller, of Sirhassan Island, and other allied races of Natuna Islands squirrels in possessing a notable rufous pencil to the tail.

COLOUR.—Upper-parts a coarse speckle of pale buff and black, the buff being in excess: sides of head and neck, chin, fore- and hind-limbs almost pure pale buff but dulled by the visible grey bases of the hairs, fore- and hind-feet clearer and less grey: a buff ring round the eyes.

Under-parts buff, palest on throat, axillæ and limbs (cream-buff); darkest on chest and down the median line of the abdomen (intense buff).

Pale lateral stripe cream buff (7-8 mm. wide), hairs of dark lateral stripe with blackish bases and buff tips, the general colour impression thus produced being a dark yellowish grey.

Tail, above, coarsely annulated black and pale buff, the annulation forming obscure bars; below, pure buff like the abdomen near the base, elsewhere with the black grizzling much reduced. A rufous pencil extending one-third up the tail below but much less above, where it is tipped and annulated with black.

In females the inguinal mammæ are surrounded by patches of white hairs about 13 mm. in diameter.

SKULL AND TEETH.—The skull is like that of *S. perhentiani* but is a little smaller, the combined nasals are narrower and have a regular V-shaped termination, and the angle formed by the sides and posterior edge of the frontal bone is less obtuse owing to the greater breadth of the latter.

As compared with *S. plasticus*, than which it is both a little longer and narrower, the terminations of the nasals are rather more anterior

* "Proceedings of the Washington Academy of Sciences," vol. iii., p. 124, 1901.

to those of the premaxillaries and the junction of sides and posterior edge of the frontal is angular.

No detailed comparison is needed with the smaller, short-nosed and relatively broader skull of *S. scottii*.

MEASUREMENTS.—Collector's external measurements of type: head and body, 191; tail, 165; hind-foot, 43; ear, 17.5. Cranial measurements: greatest length, 46; basal length, 39.1; palatal length, 21.5; diastema, 10.6; maxillary tooth-row, 9; median length of nasals, 13; greatest breadth of combined nasals, 6.2; inter-orbital breadth, 16.2; cranial breadth above roots of zygomata, 21.3; zygomatic breadth, 27.

SPECIMENS EXAMINED.—Thirty, all from the type locality. The series includes a number of specimens in which the buff of the chest and median abdomen is slightly tinged with tawny.

MUTATION-1.

EXAMPLE.—Adult female (skin and skull), No. 2124/10, Selangor Museum, collected 10th September, 1910. Original No. 3595. Other details as above.

CHARACTERS AND COLOURS.—Like the type but with the chest and whole of the abdomen tawny buff and under-sides of limbs intense buff.

MEASUREMENTS.—For measurements *see* p. 205.

SPECIMENS WITH THIS APPEARANCE.—Ten, all from the type locality.

MUTATION-2.

EXAMPLE.—Adult male (skin and skull), No. 2134/10, Selangor Museum, collected 10th September, 1910. Original No. 3584. Other details as above.

CHARACTERS AND COLOURS.—Like the type above but with the buff annulations coarser; below, tawny; the dark lateral stripe grizzled and much obliterated over its whole extent by the colour of the abdomen.

MEASUREMENTS.—For measurements *see* p. 205.

SPECIMENS WITH THIS APPEARANCE.—Six, all from the type locality.

MUTATION-3.

EXAMPLE.—Adult male (skin and skull), No. 2140/10, Selangor Museum, collected 12th September, 1910. Original No. 3648. Other details as above.

CHARACTERS AND COLOURS.—Slightly paler than *S. perhentiani*, above; similar below but with the dark lateral stripe grizzled with ochraceous-buff and reduced to a width of less than 5 mm. by the superficial extension of the rufous abdomen; slightly darker than the typical *S. proteus* above, and otherwise very different.

MEASUREMENTS.—For measurements *see* p. 206.

SPECIMENS WITH THIS APPEARANCE.—Six, all from the type locality.

REMARKS.—The East Perhentian Island squirrel differs from the Great Redang animal in that—while in the latter case departures from the generally prevailing form are still in the minority—in Perhentian Island it is the very distinct and unusually coloured animals that already predominate, and it therefore becomes necessary to take one of the latter for the type and regard the others as individuals in a stage of evolution.

The variation which this squirrel and also *S. plasticus* exhibit is extraordinary, for the island of Great Redang is perhaps ten square miles in area, while East Perhentian is about half that size only. The species most resembling *S. proteus* appears to occur on one of the Natuna Islands, but each of what are in Perhentian Island mere stages or varieties is paralleled by a distinct geographical race on one or other island of the Bornean group, each race there occupying an island by itself.*

The principal difference between *S. proteus* and these latter seems to lie in the rufous-pencilled tail of the former which, in spite of its pallid under-parts, allies it with the *miniatus* branch of the *vittatus* group.

While mutations 2 and 3 closely resemble mutation 2 of the Great Redang squirrel the two species are yet very distinct and different.

SCIURUS (VITTATUS) WATSONI.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 118, 1911.

TYPE.—Adult male (skin and skull), No. 2085/10, Selangor Museum, collected on Lantinga Island, off Trengganu, east coast of the Malay Peninsula, 6th September, 1910, by C. Boden Kloss. Original No. 8500.

CHARACTERS.—Most nearly resembles *S. subluteus*, T. & W.,† but is smaller and paler above, the yellow element being lighter, coarser and present in greater quantity, especially on head, limbs and feet. Pencil of tail more defined and intense; lateral pale stripe much broader and darker, dark stripe much shorter and much obscured by grizzling.

COLOUR.—Upper-parts a coarse speckle of buff and black; the black being much reduced or absent on sides of head and neck, forelimbs and hind-feet; an obsolete buff ring round the eyes; chin and anterior portion of throat greyish-buff.

Under-parts soiled ochraceous, slightly tinged with tawny on the chest and abdomen.

Upper lateral stripe medium buff (7.8 mm. wide); lower stripe dull black, about 10 mm. wide, strongly grizzled and obscured by the buff-ochraceous tips of the hairs and gradually blending with the colour of the upper-parts round the posterior termination of the buff stripe.

* "Proceedings of the Washington Academy of Sciences," vol. iii, pp. 124-128 (1901).

† "Annals and Magazine of Natural History," ser. 8, vol. iii., May 1900, p. 440., "Journal of the Federated States Museums," vol. iv., No. 1, Dec. 1909, p. 118.

Tail above coarsely annulated black and pale buff, the latter colour is excess on the under-surface and brighter near the base; the extremity of the tail occupied by a distinct rufous pencil, about 40 mm. long below but less above, the hairs tipped and annulated with black.

SKULL AND TEETH.—The skull of *S. watsoni* is rather smaller than that of *S. plasticus*, *S. perhentiani* and *S. proteus*, but the nasals are much longer; anteriorly their combined breadth is as great as in *S. perhentiani*, but the sides converge rapidly and beyond their centres of length are almost parallel; the posterior termination is nearly straight and in line with the end of the premaxillaries; the junction of the sides and posterior edges of the frontal is angular but far more obtusely so than in *S. perhentiani* as the posterior edge is much closer to the supra-orbital processes.

Though the skull is much smaller than that of *S. mineatus* the rostrum is equally long and it is broader anteriorly though not so deep: the nasal bones are markedly longer.

No comparison is needed with the smaller short-nosed and relatively broader skull of *S. scottii*.

MEASUREMENTS.—Collector's external measurements of type: head and body, 182; tail, 183; hind-foot, 45.5; ear, 16.5. Cranial measurements: greatest length, 46.3; basal length, 41.5; palatal length, 21.6; diastema, 11.2; maxillary tooth-row, 8.5; median length of nasals, 14.8; greatest breadth of combined nasals, 7.2; inter-orbital breadth, 16.2; cranial breadth above roots of zygomatics, 16.3; zygomatic breadth, 27.3.

SPECIMENS EXAMINED.—Nine, all from the type locality.

REMARKS.—The discovery of this squirrel in the Trengganu Archipelago is somewhat surprising since it is most nearly allied to *S. subluteus*, a strongly marked form which occupies a restricted area in the extreme south of Johore and perhaps also Tinggi Island. It needs no comparison with *S. peninsularis*, Miller,* and from the other ochraceous-bellied squirrels of the Peninsular region—*S. tenuirostris*,† Miller, *S. pemangilensis*, Miller,‡ and *S. aoris*,§ Miller, which inhabit islands of the Johore Archipelago—it is sufficient to note that it is separated by the soiled colour of the abdomen and by the possession of a small, but well defined, rufous pencil to the tail.

I have named this very distinct species in honour of Mr. R. G. Watson, Acting Resident-General of the Federated Malay States at the time of my visit to the islands, in recognition of his generous views with regard to zoological research.

* "Smithsonian Miscellaneous Collections," No. 45, November, 1903, p. 10.

† "Proceedings of the Washington Academy of Sciences," vol. ii., Aug., 1900, p. 221.

‡ "Smithsonian Miscellaneous Collections," No. 45, November, 1903, p. 9.

§ Op. cit., p. 10.

Measurements of adult squirrels of the *vitatus* group:

Name.	Locality.	R. M. No.	Sex.	Head and body.	Tail.	Hind-foot.	Ear.	Greatest length of skull.	Median nasal length.	Interorbital breadth.	Zygomatic breadth.
<i>Sciurus scottii</i>											
" type	Bedung Island	2077/10	Male	182	171	44	18	45	12.2	17.6	26.5
"	"	2078/10	Female	187	180	44	17	45.1	12.6	16.8	27.7
"	"	2079/10	Male	174	176	42	16.5	44.6	12.6	16.5	27
"	"	2080/10	Female	187	172	40.5	16.5	45.3	13	17.3	27.3
"	"	2081/10	"	173	176	42.5	16.5	...	...	16.8	26.5
"	"	2082/10	Male	176	174	42.5	16.5	44.6	12	16.7	26.3
"	"	2083/10	"	175	175	43	16	...	11.6	16	25
"	"	2084/10	Female	183	178	43.5	16.5	46.7	12	17.6	27.8
" Average	"	...	...	179.6	175.2	42.7	16.7	45.2	12.2	16.9	26.7
<i>Sciurus plasticus</i> (type)	Great Redang Island	2159/10	Female	183	185	43	16.5	46.2	13	17.2	28
"	"	2160/10	"	185	185	44	17	47	14	16.9	29
"	"	2162/10	"	190	185	43	16	46.7	12.8	17.2	27.8
"	"	2164/10	Male	189	170	41	16	47.5	13.2	16.4	28.1
"	"	2165/10	"	183	174	43	17	46.5	13.5	17.7	27.2
"	"	2168/10	"	175	175	43	16	45.6	13.5	16	26.5
" mutation 1	"	2149/10	Female	188	180	44	16.5	47.4	14	17.3	29
"	"	2151/10	"	189	171	42.5	16.5	46.8	12.8	17.1	28
"	"	2156/10	"	189	186	43.5	17	46.4	13.4	16.4	27.3
"	"	2157/10	Male	175	170	39.5	16	46.6	13.6	17.2	27.3
" mutation 2	"	2146/10	Female	179	182	42	16	46	13.9	16.6	27.5
"	"	2147/10	"	195	185	44	17	46.4	13.4	17.4	28.8
"	"	2148/10	"	195	190	42	16.5	46	14	16.8	27.5
" Average 1	"	...	...	183.5	179.7	42.4	16.5	46.5	13.4	17	27.8

Sciurus perhentiani, type	West Perhentian Island ...	2172/10	188	172	43.5	16.5	47.3	14	17.2	28.2
"	"	2174/10	195	153	45	18	50.5	13.8	17.4	28.1
"	"	2176/10	Female	194	183	45	47.5	13.6	17.5	28.3
"	"	2181/10	Male	190	165	16	47.7	13.7	17.5	27.7
"	"	2182/10	"	190	159	17	47.8	14.5	17.3	26.5
"	"	2183/10	"	190	170	16	45	14.3	16.6	26.5
"	"	2185/10	Female	192	170	17	47.5	14.4	16.2	27.8
"	"	2191/10	Male	192	179	17	49	15	17.9	28.6
"	"	2192/10	Female	197	173	16	48.4	14.4	17.1	28.3
"	"	2193/10	"	205	176	17	47	14.6	16.7	27.2
"	"	2196/10	"	182	165	17	47	14.3	16.4	27
"	"	2198/10	"	186	165	18	47.5	14.8	17.3	28.6
"	"	...	...	189.5	43.5	16.5	47.7	14.3	17.1	27.7
"	"	...	...	172.5	43.2	16.5	47.7	14.3	17.1	27.7
Sciurus proteus, type	East Perhentian Island ...	2094/10	191	165	43	17.5	46	13	16.2	27
"	"	2098/10	Male	184	176	42	45.7	12.4	16.5	27.2
"	"	2101/10	Female	188	174	43	48.8	12.3	17.4	29
"	"	2103/10	"	188	170	41.5	46.3	12.6	16	27.4
"	"	2107/10	Male	183	164	41	46	13	16.8	27.5
"	"	2120/10	"	192	178	42.5	47	13	15.7	27.4
"	"	2122/10	Female	190	165	42	45.8	12.3	16.3	27
"	"	2124/10	"	190	172	43	47.3	15	16.7	28.7
"	"	2125/10	Male	185	190	41	47.5	13	15.9	26
"	"	2127/10	Female	178	154	41	51	12	16	26.3
"	"	2128/10	"	182	166	41.5	48.8	14.2	17.9	27.8
"	"	2129/10	Male	190	175	42	46	13.4	16	26.4
"	"	2133/10	Female	178	175	41	46.3	13	16	27.3
"	"	2134/10	"	185	170	42	46.3	13.3	17.3	26.5
"	"	2136/10	Male	195	175	43	47.5	12.5	16.2	27
"	"	2138/10	"	189	168	42	46.3	13.3	16.5	29

¹ Of external dimensions of 26 adult specimens. ² Of external dimensions of 29 adult specimens.

Name.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind-foot.	Ear.	Greatest length of skull.	Median nasal length.	Interorbital breadth.	Zygomatic breadth.
<i>Sciurus proteus</i>	East Perhentian Island ...	2140/10	Male	180	180	44	17	48.3	13.5	17.1	28.3
"	"	2142/10	Female	178	172	41.5	17.5	46.5	13.3	16.5	26
"	"	2143/10	"	167	171	41.5	15.5	45.5	13	15.5	25.5
"	"	2144/10	Male	181	169	42.5	16.5	45.8	16	13.7	26.5
"	"	...	...	184.4	168.6	41.8	16.7	47	13.2	16.3	27.2
<i>Sciurus watsoni</i> , type	Lanting Island	2085/10	Male	182	183	45.5	16.5	46.3	14.8	16.2	27.3
"	"	2086/10	Female	170	185	44.5	16.5	44.6	14	15.3	25.4
"	"	2087/10	Male	183	180	45	16.5	46.3	15	16.2	27.2
"	"	2088/10	"	185	170	43	16.5	46.8	15	16.4	27.4
"	"	2089/10	Female	188	182	45	17	46.2	14.9	16.4	27.5
"	"	2090/10	"	182	170	45	17	47.3	15.2	16.7	27.8
"	"	2091/10	"	176	185	44	16.5	46.7	15	16	27.2
"	"	2092/10	"	173	187	44	17	46	14.6	16.3	27.3
"	"	2093/10	"	180	180	45	17	44.7	14	15.9	27.3
"	"	...	...	179.9	180.2	44.5	16.7	46.1	14.7	16.1	27
<i>Sciurus miniatus</i>	Bukit Jong, Trengganu	2357/10	Male	208	180	45	17	49.7	14	19	30
"	"	2363/10	Female	203	194	45	17	49.6	16	18.7	29.8
"	"	2365/10	Male	202	195	46	19	50.5	13.4	17.5	28.7
"	"	2366/10	Female	200	195	45	19	50.5	14.6	19	30
"	"	2369/10	Male	206	204	45	17	50	14.6	17.6	29
"	"	...	Female	200	187	45	17	48.2	14	17.3	28.8
"	"	...	...	203.1	192.5	45.1	17.6	49.7	14.4	18.2	29.4

¹ Of external dimensions of 48 adult specimens.

² Trengganu animals do not differ in size from topotypes from Trang, West Coast Siamese Malaya.

SCIURUS (TENUIS) SORDIDUS.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 119, 1911.

TYPE.—Adult female (skin and skull), No. 2407/10, Selangor Museum, collected on Great Redang Island, off Trengganu, east coast of the Malay Peninsula, 2nd September, 1910, by C. Boden Kloss. Original No. 3720.

CHARACTERS. —A form of *S. tenuis*, characterised by the small skull, even and regular posterior terminations of the nasals and premaxillaries, and by duller colour, closely resembling in the latter character *S. tenuis sordus*, Miller, from Trang.*

COLOUR.—Upper-parts a speckle of black and medium-buff (not ochraceous-buff as in *S. tenuis typicus*), brightest on muzzle and head. A ring round the eye, buff (not buff-ochraceous): ears, fore- and hind-feet, a wash on sides of head, shoulders, fore-limbs and thighs, pale dull ochraceous (not bright ochraceous).

Below, whitish-grey, suffused with cream-buff (paler than in *S. tenuis*), strongest on lower throat, chest and median line of abdomen.

Tail annulated black and buff, the bases of the hairs ochraceous-buff, the tips buff-white; base of under-side buff to buff-ochraceous (not ochraceous): a scarcely perceptible black pencil.

SKULL AND TEETH.—The skull and teeth generally resemble those of *S. tenuis* and *S. t. sordus* but are smaller: the posterior terminations of the nasals and premaxillaries are practically in a line, so that the sutures run evenly and continuously with a slight curve from side to side, and their serrations are not long and ragged but short and regular. The median nasal length is generally the maximum; in *S. tenuis* it is, owing to the A-shaped terminations of the combined nasals, frequently the minimum.

MEASUREMENTS.—Collector's external measurements of type: head and body, 135; tail, 105; hind-foot, 31.5; ear, 13. Cranial measurements: greatest length, 36.3; basal length, 32.3; palatal length, 13.2; diastema, 7.8; maxillary tooth-row, 6.9; median length of nasals, 10.2; greatest breadth of combined nasals, 5.1; inter-orbital breadth, 12.2; cranial breadth above the roots of zygomatic, 17.2; zygomatic breadth, 22.

SPECIMENS EXAMINED.—Ten, all from the type locality.

REMARKS.—The cranial characters of this island squirrel separate it clearly from other races of the same group. It is curious* to find that it differs markedly in colour from the bright animal inhabiting the adjacent mainland and resembles the dull-coated *S. t. sordus*, occupying a district on the west coast considerably to the north of Trengganu.

* "Proceedings of the Washington Academy of Sciences," vol. ii, p. 80 (1900).

Measurements of adult squirrels of the *Sciurus tenuis* group:

Name.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind-foot.	Ear.	Skull, great- est length.	Median nasal length.	Inter-orbital breadth.	Zygomatic breadth.
<i>Sciurus tenuis sordidus</i> ...	Great Redang Island ...	2404/10	Female	147	116	33	14.5	36	10.6	12.3	21.4
" ...	"	2405/10	Male	143	...	34	15	...	...	..	...
" ... type...	"	2406/10	Female	142	..	33	14	36.3	10.7	11.4	21.4
" ...	"	2407/10	"	135	105	31.5	13	36.3	10.2	12.2	22
" ...	"	2408/10	"	133	134	32	13	37.5	...	11.5	20.4
" ...	"	2409/10	"	132	120	31	12.5	35	10.2	11	21.3
" ...	"	2410/10	"	127	118	30.5	13	34	10.2	11.5	20
Average...	"	...	...	137	118.6	32.1	13.5	35.5	10.4	11.7	21
<i>Sciurus tenuis</i> ...	Bukit Jong, Treng- ganu ...	...	...	...	...	...	...	...	...	...	...
Seven specimens, average	"	...	...	...	...	...	...	37.5	11.3	13	22.7
<i>Sciurus tenuis</i> , <i>topotypes</i>	Singapore Island	...	...	...	...	...	...	...	...	...	...
Seven specimens, average	"	...	...	...	...	...	...	37	10.7	12.8	22.8

MUS (SURIFER) GRANDIS.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 119, 1911.

TYPE.—Adult male (skin and skull), No. 2206/10, Selangor Museum, collected on Great Redang Island, off Trengganu, east coast of the Malay Peninsula, 2nd September, 1910, by C. Boden Kloss. Original No. 3698.

CHARACTERS.—A large member of the *surifer* group, not requiring, on account of its very robust skull, any close comparison with allied forms.

COLOUR.—Upper-parts ochraceous, clouded on shoulders, back and rump with the dark brown tips of the spines, but clearer on top of head and almost pure on cheeks and sides of neck, fore-limbs, sides and thighs: top of muzzle greyish-brown, sides white.

Under-parts white, this colour continued to fore-feet down the inner side of thighs, though not reaching the heel, and extending beyond the throat and chin to lower cheeks, upper lip and sides of muzzle, where it includes the roots of many of the vibrissæ: scrotum white. Viewed from below the yellow sides of head and neck are not visible.

Fore- and hind-feet white above, tail black above, paler at tip; white below.

SKULL AND TEETH.—As compared with skulls of other *surifer* rats that of *M. grandis* is more robust and is especially remarkable for its large and heavy rostrum which is much broader and deeper, also the nasal bones are broader and the incisors heavier; there is a greater flare to the zygomatic arches and the infra-orbital plates (instead of having their anterior edges perpendicular or receding backwards from above) slant forward considerably. The interpterygoid space is distinctly wider, but the molars do not differ notably, and as in all the *surifer* rats the palate is narrowest at the posterior molar.

MEASUREMENTS.—Collector's external measurements of type: head and body, 204; tail, 188; hind-foot, 42; ear, 23. Cranial measurements: greatest length, 49 (—)*; basal length, 41.7 (43.6); nasal length, 19.8 (—): shortest distance between tip of nasals and lachrymal notch 20.4 (—); palatal length, 22 (22.7); diastema, 13.4 (14.7); molar length, 7.5 (7.0); length of foramina, 6.9 (7.2); breadth of combined foramina, 3.9 (4.0); zygomatic breadth, 21 (22.4); cranial breadth, 17.2 (17.8); depth of rostrum at anterior extremity of foramina, 9.3 (9.6); breadth of rostrum midway between henselion and foramina, 8.0 (8.0).

SPECIMENS EXAMINED.—Fourteen, all from the type locality.

REMARKS.—The entire series is in very abraded pelage and the colour given for the upper-parts must only be regarded as approximately correct. The robust skull and large size of this rat—immature individuals with unworn teeth being equal to fully grown adults of other races—render it very distinct, and it forms a notable exception to the general rule that insular races are smaller than those of the same species inhabiting the mainland.

* Measurements in parentheses those of a male (S.M. 2206/10) with worn teeth from the type locality.

MUS (SURIFER) FLAVIGRANDIS.

Kloss, *Ann. and Mag. Nat. Hist.* (8), vii., p. 119, 1911.

TYPE.—Adult male (skin and skull), No. 2220/10, Selangor Museum, collected on East Perhentian Island, off Trengganu, east coast of the Malay Peninsula, 12th September, 1910, by C. Boden Kloss. Original No. 3628.

CHARACTERS.—In size sub-equal to *M. grandis* but with a slightly larger hind-foot; pelage somewhat brighter; sides of muzzle and lower cheeks yellow, not white; white area of throat much narrower; scrotal area largely tawny. Skull generally similar but the nasals extending posteriorly beyond the lachrymal notch.

COLOUR.—Upper-parts ochraceous, clouded and darkened on shoulders, back and rump with the dark brown tips of the spines, but clearer on the top of the head and almost pure on cheeks and sides of neck, fore-limbs, sides and thighs where it becomes buff-ochraceous; top and sides of muzzle greyish-brown.

Under-parts white, this colour continued to fore-feet and down the inner sides of thighs but not quite reaching the ankles; a slight ochraceous gorget; scrotum partly ochraceous. Viewed from below the yellow sides of head and neck are distinctly visible.

Fore- and hind-feet white above; tail black above, paler at tip; white below.

SKULL AND TEETH.—The skull of *Mus flavigrandis* resembles that of *Mus grandis* save that the nasal bones are prolonged posteriorly beyond the anterior edges of the lachrymal notches.

MEASUREMENTS.—Collector's external measurements of type: head and body, 208; tail, 180; hind-foot, 43; ear, 23. Cranial measurements: greatest length, 48 (48.8); * nasal length, 42 (43.5); palatal length, 22 (23); nasal length, 20.7 (20.8); shortest distance between tip of nasals and lachrymal notch, 19.2 (19.9); diastema, 14 (14.8); molar row, 7.4 (7.8); length of foramina, 7 (7.6); breadth of combined foramina, 3.9 (4); zygomatic breadth, 21.5 (22.8); cranial breadth, 17.2 (16.8); depth of rostrum at anterior extremity of foramina, 9.1 (9.9); breadth of rostrum midway between nasion and foramina, 7.4 (8.1).

SPECIMENS EXAMINED.—Nine, all from the type locality.

REMARKS.—These specimens are in the same abraded state as the series of *Mus grandis* but they convey an impression of rather greater brightness of the upper-parts. The relative positions of the posterior terminations of the nasals and the shape of anterior roots of zygomatics, together with the narrower white throat and absence of any pale area at the roots of the vibrissae render separation of this form from *Mus grandis* very easy. Though the pale vibrissae patches are not uniformly present in individuals of all the other races of *Mus surifer*, they are to be seen in the great majority of cases, and the entire absence of these in *Mus flavigrandis* is, for differential purposes, a useful character, the best of which are, however, the great size and robust skull as in *Mus grandis*, together with the peculiar nasal feature above referred to.

* Measurements in parentheses those of a female with worn teeth from the type locality, S.M. 2222/10.

Measurements of adult rats from the Trengganu Archipelago:

Name.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind-foot.	Ear.	Greatest length of skull.	Greatest nasal length.	Tip of snout to anterior edge of lachrymal.	Zygomatic breadth.
<i>Mus grandis</i> ...	Great Redang Island	2201/10	Male	213	184	41.5	23	49	20	20.5	21.7
"	"	2202/10	Female	206	...	37	23.5	49.2	20.3	20.3	22
"	"	2203/10	Male	206	181	41	23	48.4	18.8	19.6	22
"	"	2204/10	"	213	187	41	...	49.6	21.6	20.8	22.5
"	"	2205/10	Female	213	185	39.5	23	48.2	19.2	19.5	21.2
"	"	2206/10	Male	204	188	42	23	49	19.8	20.4	21
"	"	2207/10	"	207	187	41	25	...	21	21	...
"	"	2208/10	Female	202	188	40	...	48.9	...	...	22.4
<i>Average</i>	"	...	...	208	180.7	40.3	23.4	...	20.1	20.3	21.8
<i>Mus flavigrandis</i> ...	East Perhentian Island	2215/10	Male	222	192	44	24	...	21.7	20.4	...
"	"	2216/10	Female	207	...	43	24	46.5	20.1	18.6	21.2
"	"	2217/10	Male	197	193	42.5	25	...	19.2	18.4	...
"	"	2218/10	Female	205	162	40.5	24.5	46.8	19.7	19.1	22
"	"	2219/10	Male	213	...	44.5	...	48.4	21	19.8	22
"	"	2220/10	"	208	180	43	23	48	20.7	19.2	21.5
"	"	2221/10	Female	212	176	41.5	23.5	48.3	21	19.8	21.7
"	"	2222/10	"	220	...	41	24	48.8	20.8	19.9	22.8
<i>Average</i>	"	...	...	201.5	180.6	42.5	24	47.8	20.5	19.4	21.9

MUS BATTUS JALORENSIS, BONH

Great Redang Island. 11 ♂ 7 ♀.

East Perhentian Island. 28 ♂ 18 ♀.

Accepting for the present Bonhotes' name of *Mus jalorensis* as applicable to all the white-bellied animals of the *rattus* group occurring in the Malay Peninsula, I place these examples from the Trengganu Archipelago under the same title, and pending a thorough examination and revision of the group, it may also cover the animals inhabiting many of the adjacent Islands—i.e., Sibul, Jemur, the Langkawis and Terutau—though certain small differences are perceptible amongst all these.

From dimensions it would appear that the Great Redang animal is the smaller of the two, but the series consists of nine adult individuals only against 30 from East Perhentian Island:

		Head and body.		Tail.		Hind-foot.		Ear.
Redang	average . .	176.2	...	187.8	...	35.5	...	20.4
Perhentian	„ ...	181.3	...	200	...	35.6	..	21.3
Redang	maximum	183	...	202	...	36	...	21
Perhentian	„	197	...	225	..	38	...	22.5
Redang	minimum	165	...	177	...	33.5	...	19.5
Perhentian	„	172	...	193	...	34	...	20.5

TRAGULUS BAYUS, MILLER.

Great Redang Island. 1 ♂.

The single example obtained does not appear to differ in any respect from the mainland animal. Collector's external measurements: head and body, 405; tail, 65; hind-foot, 105; ear, 32. Cranial measurements: greatest length, 88; basal length, 76; zygomatic breadth, 39; least interocular breadth 26.

NOTES ON TWENTY-THREE SPECIMENS OF *PTEROPUS HYPOMELANUS LEPIDUS*.

By KNUD ANDERSEN.

The series of *Pt. hypomelanus lepidus* on which the following notes are based is, thus far, the largest ever brought together for examination on one spot. A brief account of the individual variations exhibited by this series, chiefly as regards the colours of the fur, may therefore be of some interest to specialists.

MATERIAL EXAMINED.

BIG TAMBELAN ISLAND.—Three skins with skulls (two ♂ ad., one ♀ ad.), Aug. 9, 1899, paratypes of "*Pteropus lepidus*," Miller; U. S. National Museum, 101,649, '50, '51.

PULAU AOE.—One alcoholic with skull (♀ ad.), June, U. S. National Museum, 112,404.

PULAU TIOMAN.—Three skins with skulls (all ♂ ad.), June, 1906, and Sept., 1907; Kuala Lumpur Museum, 282, and B. M. 8, 1, 25, 2 and 8, 2, 25, 2.

LANTINGA ISLAND.—One skin with skull (♀ subad.), Sept. 6, 1910; Kuala Lumpur Museum, 2,051.

GREAT REDANG ISLAND.—Nine skins with skulls (four ♂ ad., one ♂ subad., two ♀ ad., two ♀ subad.), Aug. 31-Sept. 4, 1910; Kuala Lumpur Museum, 2,056-2,060, and B. M. 11.1.30. 4-7.

PERHENTIAN ISLAND.—Seven skins with skulls (two ♂ ad., two ♀ subad., two ♀ ad., one ♀ subad.), Sept. 9-13, 1910; Kuala Lumpur Museum, 2,047-2,050, and B.M. 11.1.30. 1-3.

The nine specimens (P. Tioman, Great Redang, Perhentian) in the possession of the British Museum have been presented by the Government of the Federated Malay States, through Messrs H. C. Robinson and C. B. Kloss. The four from Big Tambelan and Aor Islands were borrowed from the U. S. National Museum, through Mr. Gerrit S. Miller, Jr., during the preparation of the B.M. Catalogue of Megachiroptera. The remaining ten specimens (P. Tioman, Lantinga, Great Redang, Perhentian) are the property of the Kuala Lumpur Museum and were sent to the British Museum for examination and identification.

The Tambelan Islands (type locality of *Pt. h. lepidus*) are situated in the S. China Sea, about midway between Borneo and the southern point of the Malay Peninsula. P. Aor and Tioman close together off the south-east coast of the Peninsula; P. Lantinga, Great Redang, and Perhentian close together off the east coast of the Peninsula (at Trengganu), some 200 miles north of P. Tioman.

COLOUR OF BACK.

The darkest * specimens in the series have the back seal-brown or blackish brown distinctly sprinkled with light greyish (silvery-grey, white-grey) hairs; though conspicuous, the greyish sprinkling is not nearly strong enough to obliterate the seal-brown element of the coloration, the general impression of the colour of the back being a blackish or blackish brown tinge, thinly grizzled with light grey

* In point of colour the extreme eastern races of *Pt. hypomelanus* (*vis.*, *Pt. h. luteus*, from New Guinea, and *Pt. h. hypomelanus*, from the Gilolo group) are the most "ordinary-looking" forms of this widely distributed and highly variable species—*i.e.*, the colours of the back (approximately Prout's brown), mantle and under-parts (ochraceous-buff or same related tinge) are not essentially different from those of many other species of *Pteropus*. So far as the colour of the fur are concerned, those eastern races may therefore be considered the least modified forms of the species. *Pt. h. lepidus* exhibits two important modifications of the colours—*vis.*, (1) a conspicuous, often even excessive, admixture of light grey in the colour of the back, and (2) a considerable darkening of the bright colour of the mantle and under-parts. In describing the individual variations of the colour of the back in *Pt. h. lepidus* it therefore appears natural to pass from the *darkest-backed* specimens (those exhibiting the thinnest admixture of light grey) to the *palest-backed* (strongest admixture of grey); and in describing the variations of the mantle and under-parts from the lightest extreme (nearest *luteus*) to the *darkest* (specimens in which the original bright colour of the mantle and under-parts is partly or wholly replaced by darker tinges).

(examples: Big Tambelan, 101,651, paratype; Perhentian, 11.1.30.2 and 2,050; Great Redang, 2,059).

From this darkest extreme the colour variations go in three directions: (1) the light greyish element is increased and the blackish or seal-brown more and more suppressed in the same proportion; or (2) the blackish or seal-brown element is lightened into paler tinges of brown; or (3) both changes are combined.

By increase of the light grey (silvery grey, white-grey) and corresponding decrease of the blackish (seal-brown) element the general colour of the back is transformed into dark brown heavily mixed with light grey (Tioman, 8.1.25.2; Perhentian, 11.1.30.1 and 2,047; Great Redang, 2,057 and 2,060); into light mouse-grey (Tioman, 8.2.25.2; Great Redang, 11.1.30.5); and from this through various intermediate stages into the lightest extreme, in which the colour of the back may be roughly described as light grey (silvery grey, white-grey, sometimes with a wash of buffy) more or less thinly sprinkled with blackish (Big Tambelan, 101,649, paratype; Great Redang 11.1.30.7). The modifications take place by the seal-brown or blackish brown hairs being gradually to a greater and greater extent replaced by *light grey hairs. The darkest-backed and lightest-backed specimens are so strikingly different in appearance that, if these only were known and if they happened to have been obtained in different islands, few zoologists would hesitate to consider them distinct species.

Either independent of this gradual spreading of the light greyish element, or, on the contrary, combined with same takes place, in some specimens, a gradual lightening of the blackish or seal-brown element itself. By this change the general colour of the back becomes some tinge of dark brownish (between seal-brown and vandyck-brown) more or less heavily mixed with grey (Perhentian, 11.1.30.1 and 3, 2,048); or, by increase and further lightening of the greyish element, mouse-grey or pale grey more or less strongly washed with vandyck brown. Prout's brown, or mars-brown.

(Big Tambelan, 101,650, paratype; Aor, 112,404; Great Redang, 11.1.30.6 and 2,058). Finally, the mars-brown tinge may spread over nearly the whole of the back, rendering the general colour light mars-brown sprinkled with greyish (Lantinga, 2,051).

COLOUR OF UNDER-PARTS.

The palest extreme is represented by specimens with the whole of the breast and belly dark cinnamon-rufous (palest, more golden, in the

* It is perhaps not unnecessary to say that, whether the *same individual* exhibits, during its life-time, various stages of lightening of the colour of the back, or whether the colour once acquired is preserved essentially unmodified during the life-time of the individual, is entirely unknown. When it is said above that the blackish hairs are gradually "replaced by" light grey, it only means that, passing from the darkest through many intermediate stages to the lightest specimens, it is quite evident that the colour of the latter is produced by a gradual increase of the greyish and corresponding decrease of the blackish elements.

centre) or between this colour and chestnut, and the flanks dark chestnut or seal-brown (Great Redang, 2,058, '59; Lantinga, 2,051). In many specimens, however, the dark chestnut or chestnut seal-brown tinge, instead of being confined to the flanks, has spread over a smaller or greater portion of the sides of the breast and belly thus restricting the golden cinnamon-rufous or golden chestnut colour to the centre of the breast and belly (Big Tambelan, 101,649 and '50, paratypes; Tioman, 8.1.25.2. and 8.2.25.2; Great Redang, 11.1.30.4 and 6, 2,056 and '57; Perhentian, 11.1.30.3, 2,048 and '49). This leads, finally, to the darkest extreme, in which the dark colour has encroached also upon the *centre* of the breast and belly, so as to make the whole of the underside of the animal practically seal-brown (perhaps more correctly a tinge of chestnut so dark as to closely approach seal-brown); Big Tambelan, 101,651, paratype: Great Redang, 11.1.30.5 and 2,060; Perhentian, 11.1.30.1 and 2, 2,047 and '50); but even in these specimens a faintly brighter (golden) tinge is still detectable on the centre of the breast, at least in certain lights.

In a limited number of specimens another modification of the colour of the underparts takes place—*viz.*, a spreading of the pale greyish element (*see* colour of back) over the anal region and a part or the whole of the flanks (Big Tambelan, 101,649, '50, paratypes; Tioman, 8.1.25.2, 8.2.25.2; Great Redang, 11.1.30.7).

The darkening of the colour of the under-parts takes place quite independently of the modifications of the colour of the back; that is, bright-bellied or dark-bellied individuals may exhibit any amount of greyish admixture on the back.

COLOUR OF MANTLE AND HEAD.

Generally speaking, the mantle and head are similar, or nearly similar, in tinge to the breast and belly—*i.e.*, specimens in which the brighter (golden chestnut, golden cinnamon-rufous) tinges are relatively conspicuous on the breast and belly (or centre of these) have, as a rule, the same tinges predominant, or at least conspicuously developed, on the mantle and crown, whole specimens with practically uniform seal-brown under-parts usually exhibit the same dark tinge on the mantle and head (except at the concealed base of the fur, which even in the darkest-coloured individuals is nearly always brighter-coloured).

The palest extremes are seen in specimens with the mantle and centre of the crown golden cinnamon-rufous or golden hazel (the tinge might perhaps equally well be described as deep golden tawny); but even in these specimens the forehead, sides of the head and neck, often also the line of demarcation between mantle and back are chestnut or seal-brown; or the golden cinnamon-rufous (hazel) tinge may be more or less considerably clouded or blotched with chestnut (Great Redang, 2,056, '57, 58, 59; Perhentian, 11.1.30.3, 2,049). This clouding or blotching with a darker tinge increases gradually, in other individuals, to such degree as to render the general impression of the colour a

paler or darker chestnut, more or less conspicuously or inconspicuously lightened with golden cinnamon-rufous (hazel), the latter tinge being sometimes restricted to the centre or the posterior portion of the mantle, or to the centre of the crown, or represented only by a distinct brighter "wash" of the general chestnut colour of the mantle and crown (Big Tambelaa, 101,649, '50, paratypes; Tioman, 8.1.25.2, 8.2.25.2; Great Redang, 11.1.30.4, 5, 6, 7, 2,060; Perhentian, 2,048, '50). When even this remnant of a brighter tinge has nearly or entirely disappeared, we arrive at specimens with nearly or quite uniform dark chestnut-seal-brown mantle and crown (Big Tambelan, 101,651, paratype; Perhentian, 11.1.30.1, 2, 2,047).

ARE ALL THE SPECIMENS REFERABLE TO ONE RACE?

The question must be answered decidedly in the affirmative. In the case of a form so variable in colour as that have under consideration it would, of course, require a very large series of specimens from each of the six islands represented to give the actual proof that the variations in colour are precisely the same in each place. But, although the series from this point of view is wholly inadequate, there is still ample evidence that the specimens are representatives of one indivisible race. In order to give the reader an idea of the variations of colour exhibited, in the present series, from each island, the following method has been adopted (the single alcoholic specimen from P. Aor is, in this connection, left out of consideration, because it is not before me at the moment of writing these lines):

(1) COLOUR OF BACK.—The darkest-backed extreme (least admixture of grey) in the whole series of specimens, irrespective of locality, is called 1, the lightest-backed (largest admixture and lightest tinge of grey) 15, the intermediate stages 2-14. It will be found, then, that the following stages are represented:

From Big Tambelan Islands: 1, 6 and 13;

From P. Tioman: 6 and 8;

From Lantinga: 10 (unusually strongly suffused with pale mars-brown).

From Great Redang: 2, 3, 6, 8, 9, 10, 11, 11 and 15;

From Perhentian: 2, 2, 2, 4, 4, 5 and 7.

The Redang series, it will be noticed, gives an approximately complete view of all the stages of the colour of the back. In the smaller series from Perhentian (situated nearest Great Redang) only the darker half of the scale of modifications happens to be represented. The single specimen from Lantinga and the two from Tioman show three different medium stages, the three from Tambelan the extremes (approximately) and one of the medium stages. There cannot be much doubt, therefore, that a longer series from each island would show an identical series of modifications of the colour of the back.

(2) COLOUR OF UNDER-PARTS.—No. 1 indicates the lightest, No. 15 the darkest colour of the under-parts, Nos. 2-14 the intermediate stages.

The following variations are represented :

From Big Tambelan Island : 5, 6 and 15 ;

From P. Tioman : 5 and 6 ;

From Lantinga : 3 ;

From Great Redang : 1, 3, 5, 7, 8, 9, 10, 13 and 15 ;

From Perhentian : 2, 4, 6, 11, 12, 13 and 14.

The sexes do not differ appreciably in colour (but males *average* slightly larger, the canines of males average a little longer and stouter, and the zygomatic breadth is relatively greater). So far as the present series goes, subadult (*i.e.*, nearly full-grown) individuals do not differ conspicuously in colour from fully adults ; quite young individuals have not been available for comparison.

For measurements see table at end of this paper.

AFFINITIES.

The closest known relative of this form is without doubt *Pt. h. canus*, from the North Natuna Islands. In both of these races the admixture of light grey (silvery grey) in the colour of the back has become a fixed and very conspicuous character ; they are the only two races of *hypomelanus* in which the preniolars and molars average larger than usual ; and they are both inhabitants of islands in the South China Sea. *Pt. h. canus* differs, in fact, only in having, as a rule, the silvery grey element even more strongly developed and purer in tinge, and the colour of the crown normally paler.

It must be emphasized, however, that the development of grey in the coloration of the back is by no means a character absolutely confined to these two races, *canus* and *lepidus*. It is, on the contrary, a feature that can be traced in all the western races of the species (that is, in all races inhabiting the region from Borneo westward) only the admixture of grey is in no other race so strong and so constant, nor the tinge of the grey colour so light and silvery. A grey sprinkling of the dark colour of the back (sometimes even rather heavy) occurs *sporadically* in *Pt. h. tomesi* (Borneo) ; is common in *Pt. h. annectens* (*S. Natunas*) ; present, but the grey colour normally of a considerably darker tinge, in *Pt. h. enganus* (Engano), *geminorum* (Mergui Archipelago), and *condorensis* (Siam, Cambodia, Pulau Condor) ; thin or sometimes practically absent in *Pt. h. robinsoni* (Sembilan Islands, Straits of Malacca, off west coast of Malay Peninsula). It is evident, therefore, that the silvery colour (or admixture to the colour) of the back in *Pt. h. canus* and *lepidus* represents only the extreme phase of tendencies present in all western (Indo-Malayan) races of the species.

Instances of a slight sprinkling of the dark colour of the back with grey are very common in the species of *Pteropus* ; it is, in fact, relatively seldom that the colour of the back of a *Pteropus*, if it is

seal-brown or some other dark tinge of brown, is absolutely devoid of scattered grey hairs. But parallels to what has been described above in *Pt. h. canus* and *lepidus*—*viz.*, an extensive or even almost complete replacing of the seal-brown by light grey hairs—are rare within the genus. Perhaps the two most noteworthy instances are these: in *Pt. melanotus* (*nicobaricus*, auct.) the back is usually blackish seal-brown, with a few greyish-white hairs, as a rule, detectable on close examination; but in the island of Nias, *Pt. melanotus* is replaced by a distinct, though closely allied, species, *Pt. niadicus*, in which the seal-brown is thickly mixed with light grey (but the amount of greyish admixture individually variable, as in the case of *Pt. h. canus* and *lepidus*). In *Pt. melanopogon* (Amboina group) the back is glossy blackish seal-brown, in the Aru Island representative of the *melanopogon* group—*viz.*, *Pt. aruensis*—silvery greyish, everywhere thinly sprinkled with blackish hairs—that is, the seal-brown of *Pt. melanopogon* is almost completely replaced by silvery grey. This latter is within the whole genus, the closest analogy to the modification of the colour of the back in *Pt. h. canus* and *lepidus*.

Measurements of fully adult individuals :

	Skull.						
	Fore-arm.	Third meta-carpal.	Total length.	Zygo-matic breadth.	Mandible length.	Upper teeth, c.-in. ²	Lower teeth c.-in. ²
<i>Tambelan</i> (3)	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Minimum ...	181	91	62.5	34.2	50	25.3	27.8
Maximum ...	139	95	67.2	38	53	26.2	29.8
<i>Aor</i> (1)							
♀ ad. ...	137	97	65.8	...	52	25	27.8
<i>Tioman</i> (3)							
Minimum ...	132	92	66.8	37	52	25.8	28.8
Maximum ...	137	96	67.5	38.5	52.5	26	29.5
<i>Bedang</i> (6)							
Minimum ...	136.5	89	63	32.6	48.5	23.2	26.8
Maximum ...	144	98.5	68.5	37.8	53	26.2	28.8
<i>Perhentian</i> (4)							
Minimum ...	133.5	89	63	33.8	49	23.8	26
Maximum ...	140.5	93.5	66.8	36	51.8	25.2	27.8
<i>All adults</i> (17)							
Minimum ...	181	89	62.5	32.6	48.5	23.2	26
Maximum ...	144	98.5	68.5	38.5	53	26.2	29.8

ON MAMMALS AND BIRDS FROM THE HILLS OF NEGRI SEMBILAN.

By C. BODEN KLOSS, F.Z.S., M.B.O.U.

IN July, 1910, I made a short collecting visit to the Telapa Buroh and Berumbun Hills group in Negri Sembilan, and by permission of the authorities of the Raffles Museum, Singapore, Mr. Valentine Knight of that institution joined me at Seremban.

Of these hills, which attain in Gunong Telapa Buroh a height of 3,915 feet and are bounded on the north by the pass from Seremban to Jelebu (1,300 feet) and on the south towards Gunong Angsi (2,659 feet) sink to a still lower level, we had hoped to work the upper slopes with a view to ascertain whether the fauna of the main mountain range of the Peninsula, well represented in Selangor, extended so far southwards. Owing, however, to the unsatisfactory carriers we had to make use of, we finally camped on Bukit Lantai, at a height of 2,400 feet, and from thence collected upwards to 3,300 feet, finding throughout species very few both in number and in individuals and of a purely sub-montane type, thus confirming the conclusions of Robinson, derived from the examination of a small collection from Gunong Angsi which was made in November, 1904, and contained several migratory birds not met with by us.

I was compelled to return to Seremban after a few days, and a week subsequent to my departure, Mr. Knight and the collectors descended to Bukit Tangga in the Seremban-Jelebu Pass and settling themselves in the Rest-house at an altitude of 1,300 feet worked that neighbourhood for a further ten days.

Since Robinson's list of Gunong Angsi Vertebrates ("Journ. F.M.S. Museums," i., p. 25, 1906) was the only one in existence dealing with the fauna of this district of Negri Sembilan, I now record the mammals and birds obtained on the adjacent group of hills, together with some additional species obtained by the Museum collectors on Gunong Angsi during a second visit in the month of April and not included in his account of the first collection.

MAMMALS.

1. *HYLOBATES LAE* (LINN.).

Bukit Lantai, 2,500 feet. 3 ♂.

These animals are all in the dark phase of pelage. The White-handed Gibbon was fairly common at Bukit Lantai, but was not obtained at the lower collecting station.

2. *PRESBYTIS OBSCURA* (REID).

Bukit Tangga, 1,300 feet. 1 ♂.

The exceedingly dark pelage of this dusky Lotong renders it somewhat abnormal for the locality; it more nearly resembles the northern race than the typical form occupying the lower portion of the Peninsula.

3. *PRESBYTIS SIAMENSIS* (MÜLL. AND SCHLEG.).

Bukit Lantai. 1 ♂.

A Grey-thighed Lotong exactly resembling topotypes from Malacca.

4. *RATUFA AURHIVENTER* (GEOFFR.).

Ratufa bicolor, Robinson, p. 26.

Bukit Tangga. 2 ♂; 1 ♀.

The Yellow-bellied Giant Squirrel is by far the commonest form of the genus in this region: the colour of the feet of these examples ranges from brown to yellow.

5. *RATUFA MELANOPEPLA*, MILLER.

Bukit Tangga. 1 ♂.

Bukit Lantai. 1 ♂.

The Black-and-tan Giant Squirrel is a much rarer animal than the preceding: the abdomens of both the examples obtained are of an exceedingly pure yellow.

6. *SCIURUS HIPPIURUS*, IN. GEOFF.

Bukit Lantai. 1 ♀.

The Variegated Squirrel is a very stable form and in the Peninsula is one of the least abundant of the genus though widely distributed.

7. *SCIURUS VITTATUS MINIATUS*, MILLER.

Bukit Lantai. 1 ♂.

The Rufous-bellied Buff-striped Squirrel, generally met with in numbers throughout the Peninsula, appears to be rare on the group of hills where collecting was undertaken.

8. *SCIURUS TENUIS*, HORSE.

Bukit Lantai. 3 ♂; 3 ♀.

The Slender Squirrel was common on the upper part of the mountain but was not observed at the lower collecting station.

9. *SCIURUS ROBINSONI ALACRIS*, THOMAS.

Bukit Tangga. 1 ♂.

The Southern White-bellied Squirrel has not previously been obtained southward of Selangor.

10. *LABISCUS JALOEENSIS*, BONHOTE.

Funambulus insignis, Robinson, p. 26.

Bukit Lantai. 1 ♂.

This example of the Striped Ground-Squirrel more nearly resembles the dominant Peninsular form than it does that occurring in the extreme south and Singapore Island.

11. *MUS VOCIFERANS*, MILLER.

Bukit Tangga. 3 ♂; 1 ♀.

Bukit Lantai. 2 ♂.

The Long-tailed Spiny Hill-Rat is widely distributed throughout the Peninsula where it is perhaps the most abundant of the larger rats.

12. *MUS PELLAX*, MILLER.

Bukit Lantai. 4 ♂; 2 ♀.

The Brown-backed Spiny Rat is generally found in association with the Tawny-backed Spiny Rat (*Mus surifer*) but in far smaller numbers. On Bukit Lantai, however, it was fairly common and totally displaced the other species.

13. *MUS VALIDUS*, MILLER.

Bukit Tangga. 2 ♂.

The Shaggy Rat is by far the commonest member of the *muelleri* group in the Peninsula; it is a wide ranging animal, being found from swampy grounds at the sea level to heights of four and five thousand feet.

14. *MUS JALORENSIS*, BONHOTE.

Bukit Tangga. 1 ♀.

15. *TUPAIA FERRUGINEA*, RAPPIES.

Bukit Tangga. 1 ♂ imm.

16. *CYNOPTERUS (NIADIUS) MINOR*, LYON.

Bukit Tangga. 1 ♀.

The occurrence of this Bat—obtained by Mr. Valentine Knight at the Rest-house in the pass between Seremban and Jekebu—which is apparently referable to *C. (N.) minor*,¹ from the lowlands of Eastern Sumatra, rather than to *C. (N.) harpax*,² from the Semangko Pass on the Selangor-Pahang boundary, has led me to bring together such material as is available of the sub-genus *Niadus*.³ This was founded on a bat from the Island of Nias, West Sumatra, but on account of the large size of the animal (length of head and body, 143 mm; of skull, 38.2 mm.) the latter need not be considered here.

The second form of the sub-genus, *C. (N.) minor*, came from the banks of the Siak River, East Sumatra; and the third, *C. (N.) harpax*, was described from an animal, one of a bunch of five, shot near the Rest-house in the Semangko Pass at an altitude of 2,700 feet: finally there is the present adult female from Negri Sembilan obtained at an altitude intermediate between the former two.

All the Semangko Pass animals were badly damaged by shot: one skull is fairly complete, two (including the type) are fragmentary, and those of the remaining animals were completely destroyed. The latter, however, were immature males and the skins serve to show that the pelage of such does not differ from that of the adult female.

An adult male differs slightly from the type, being in colour olivaceous-brown above, darkest on the head, with the nape slightly tinged with ochraceous; all the hairs with pale bases: sides of neck and the throat brilliant ochraceous, remaining under-parts greyish-buff, the median area greyer with an oblong tawny patch at the centre of the abdomen.

The female and young males are much darker and greyer above with the nape slightly paler; the sides of neck and the throat are buffy, and the rest of the lower surface varies from brownish-grey to deep fawn.

C. (N.) minor from Negri Sembilan is olivaceous-brown above, much darker and greyer on head and nape with no trace of collar: sides of neck and the throat dull ochraceous-yellow, remaining under-parts dull greyish-buff, much greyer and darker on the median area of the abdomen.

¹ Lyon, "Proc. U. S. Nat. Mus.," xxxiv., p. 665 (1906).

² Thomas and Wroughton, "Ann. Mag. Nat. Hist." (8), iii., p. 439 (1909); Journ. F.M.S. Museums, iv., p. 106 (1909).

³ Miller, "Proc. Biol. Soc., Washington," xix., pp. 61 and 83 (1906).

The antebrachial and wing membranes are black except close to the body where they are pale, and over the bones of the fingers which are sharply indicated is white.

The ears are somewhat pointed, their posterior edges slightly concave below the tips and there is a slight rounded lobe at the base. The edges are white but that colour does not extend to the extremities.

Below is a table of dimensions as far as it is possible to obtain them:

	C. (N.) minor ♂ type.	C. (N.) minor ♀ N. S.	C. (N.) harpax ♂.	C. (N.) harpax ♀.	C. (N.) harpax ♂ type.
Head and body ...	100	100	105	98	105
Tail ...	8	7.5	7	5	7
Tibia ...	26	27			
Foot ...	17	16	15	14	
Forearm ...	72	72	...	...	72
Thumb ...	27	26.7	25.5	26	
2nd finger ...	48	49.5			
3rd metacarpal ...	...	48	47.7	44	48
III ¹ ...	...	31	32	29.7	31
III ² ...	...	44.5	43	36.5	40
Total 3rd finger ...	108	123.5	122.7	110.2	119
4th metacarpal ...	...	45	46.3	41.5	
IV ¹ ...	...	24	24	23	
IV ² ...	...	27.3	27	23.5	
Total 4th finger ...	89	96.3	97.3	88	
5th metacarpal ...	...	46.2	47.8	43	
V ¹ ...	...	22	22.5	20.5	
V ² ...	...	23.4	23.7	20.5	
Total 5th finger ...	77	91.6	94	84	
Ear ...	...	16.5	15	18	
Skull, greatest length ...	32.8	32			
Condyllo-basal length ...	30	30.5			
Basal length ...	26.4	26.7			
Palatal length ...	16.6	16			
Zygomatic breadth ...	21	22	23	...	22.5
Cranial breadth ...	14.4	14.2	14.5		
Interorbital breadth ...	6.5	6.5	6.5	6.2	6.5
Postorbital breadth ...	7.5	7.2	6.2		
Length of mandible ...	25	25	27	24	
Maxillary tooth-row in- cluding canine ...	11.2	10.6	10.5	10	
Mandibular tooth-row ex- cluding incisors ...	12.2	11.8	12.9	11.8	
Tip of nasals to supra- orbital foramen ...	...	18.1	13.6	...	18.7
Basal-snual length ...	...	25.7	27.7		
Tip of nasals to posterior orbital extremity ...	...	30.5	32.6		

It will be seen that the Negri Sembilan example closely resembles the type of *C. minor* save in two particulars: the length of the 3rd, 4th and 5th fingers which in the latter is notably greater, while the Sumatran animal also seems to possess longer tooth series; all other measurements are within the limits of specific variation. The type of *C. minor* is, however, immature, and though of greater bodily length is closely approached in wing dimensions by the young animals from the Semangko Pass.

On the other hand, while the body measurement of the Negri Sembilan animal and *C. harpax* are very similar, the only available skull of the latter is considerably the larger of the two; it is, however, more adult, possessing well-developed sagittal and occipital crests, which are present, but to a less degree, in the former. Additional differences exhibited by *C. harpax* are a more deeply grooved inter-orbital region, a more pear-shaped brain case, a shallower rostrum and a relatively narrower mandible.

The principal differences between the two forms lies in the shape of the teeth, which in the Negri Sembilan animal are very broad and square, agreeing with those of the type of *C. minor* and differing notably from the oblong, posteriorly narrowing teeth of *C. harpax*.

With regard to the tubercles on the lower molars which, with the shape of the teeth, are the features on which the subgenus is erected, interesting variations occur in the series here dealt with.

In the Semangko Pass female pm_1 is a simple *Cynopterine* tooth without any central cusp whatever, while m_1 possesses a single well-developed tubercle.

In the type of *C. harpax* and in the Negri Sembilan female pm_1 and m_1 each clearly exhibit a single tubercle only.

In the male from the Semangko Pass pm_1 is furnished with two tubercles and such is also the case with m_1 , though in this tooth the second and posterior tubercle is somewhat rudimentary.*

Thus, in a very small series, are animals having premolars with none, one and two, and molars with one and two tubercles. Thomas and Wroughton state that true *Cynopterus* has occasionally a small extra cusp on m_1 and cite a specimen from Bombay with this feature: so there seems to be a complete connection between the typical narrow-toothed cusplless *Cynopterus* and the square-toothed doubled-tubercled *Niadius* in this respect.

The Negri Sembilan animal is of considerably greater bulk than the common Lesser Fruit-Bat or "Klawar," and Mr. Knight states that the white markings of the membranes are characteristic of the living animal. *C. (N.) minor* is apparently of a sub-montane habit in the Peninsula: more examples are required.

* The teeth of *Niadius princeps*, as figured by Miller in "The Families and Genera of Bats" (U. S. N. M., Bulletin 57, pl. viii., 1907), agree in the form of the tubercles with those of this individual.

BIRDS.

1. *TRERON NIPALENSIS*, HODGS.

Bukit Tangga, 1,300 feet. 2 ♂; 2 ♀.

2. *MACROPYGIA RUFICEPS* (TEMN.).

Bukit Lantai. 1 ♀.

3. *MICROHIERAX FRINGILLARIUS* (DRAF.).

Gunong Angsi, 1,500-2,500 feet.

4. *ALCEDO EURYZONA*, TEMN.

Bukit Lantai, 2,400 feet. 1 ♂.

This example of the rare Broad-zoned Kingfisher was shot on the bank of a swiftly-running mountain stream in a deep gulley at an altitude of 2,200 feet.

5. *CARCINEUTES PULCHELLUS* (HOEST.).

Gunong Angsi, 1,500-2,500 feet.

6. *CRANORRHINUS CORRUGATUS* (TEMN.).

Bukit Tangga. 1 ♂.

7. *ANORRHINUS GALERITUS* (TEMN.).

Bukit Lantai. 1 ♀.

The Glossy Hornbill is one of the commonest of the genus in sub-montane localities, but is not met with elsewhere.

8. *NYCTIORNIS AMICTA* (TEMN.).

Bukit Tangga. 4 ♂; 1 ♀.

Gunong Angsi, 1,500-2,500 feet.

LYNCORNIS TEMMINCKI, GOULD.

Gunong Angsi, 1,500-2,500 feet.

9. *MACROPTERYX COMATA* (TEMN.).

Bukit Tangga. 1 ♂.

10. *PYROTROGON KASUMBA* (RAFFLES).

Bukit Lantai, 1 ♂; 1 ♀.

11. *PYROTROGON DUVAUCELI* (TEMN.).

Bukit Tangga. 1 ♂.

12. *PYROTROGON ORESKIUS* (TEMN.).

Bukit Tangga. 1 ♂.

Bukit Lantai. 1 ♂; 1 ♀.

13. *ZANCLOSTOMUS JAVANICUS* (DUMONT).

Bukit Tangga. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

14. *RHOPODYTES SUMATRANUS* (RAFFLES).

Bukit Tangga. 1 ♂.

15. *UROCCOXYX ERYTHROGNATHUS* (HARTL.).

Bukit Tangga. 4 ♂; 1 ♀.

16. *CALORHAMPUS HAYI* (J. E. GREY).

Bukit Tangga. 4 ♂; 2 ♀.

17. *CHOTORHEA CHRYSOPOGON* (TEMN.).

Bukit Tangga. 3 ♂; 3 ♀.

18. *CHOTORHEA MYSTACOPHANES* (TEMN.).

Bukit Tangga. 1 ♂.

19. *CYANOPS HENRICI* (TEMN.).

Bukit Tangga. 7 ♂; 1 ♀.

Bukit Lantai. 1 ♀.

20. *MESOBUCCO DUVAUCELI* (LESS.).

Bukit Tangga. 8 ♂; 6 ♀.

Bukit Lantai. 1 ♂.

In this series such individuals as have not attained fully adult plumage have the ear coverts strongly suffused with green or blue.

21. *GEVINUS OBSERVANDUS*, HARTERL.

Bukit Tangga. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

22. *PYRRHOPICUS PORPHYROMELAS* (BOIE.).*Lepocestes porphyromelas*, Robinson, *op. cit.* p. 29.

Bukit Tangga. 1 ♀.

Bukit Lantai. 1 ♂.

23. *MIGLYPTES GRAMMITHORAX* (MALU.).

Bukit Tangga. 8 ♂; 1 ♀.

24. *MIGLYPTES TUKKI* (LESS.).

Bukit Tangga. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

25. *MICROPTERNUS BRACHYURUS* (VIEILL.).

Bukit Tangga. 1 ♀.

26. *CHRYSOPHLEGMA MALACCENSE* (LATH.).

Gunong Angsi, 1,500-2,500 feet.

27. *CHRYSOPHLEGMA HUMELI*, HARGITT.

Bukit Tangga. 2 ♂.

Bukit Lantai. 1 ♂; 1 ♀.

28. *CHRYSOCOLAPTES VALIDUS* (TEMN.).

Bukit Tangga. 2 ♀.

29. *CALYPTOMENA VIRIDIS*, RAFFLES.

Bukit Tangga. 4 ♂; 3 ♀.

30. *EURYLÆMUS JAVANICUS*, HORSF.

Bukit Tangga. 1 ♂.

31. *EURYLÆMUS OCHROMELAS*, RAFFLES.

Bukit Tangga. 2 ♂; 2 ♀.

32. *CORYDON SUMATRANUS* (RAFFLES).

Bukit Tangga. 2 ♀.

33. *HYPOTHYMIS AZUREA* (BODD.).

Bukit Lantai. 1 ♂.

34. *RHIPIDURA PERLATA*, S. MÜLL.

Bukit Lantai. 2 ♂.

TERPSIPHONE AFFINIS (BLATH).

(Gunong Angsi, 1,500-2,500 feet.

35. *PHILENTOMA VELATUM* (TEMM.).

Bukit Tangga. 2 ♂; 1 ♀.

Bukit Lantai. 3 ♂.

36. *PHILENTOMA PYRRHOPTERUM* (TEMM.).

Bukit Tangga. 1 ♂.

Bukit Lantai. 3 ♂; 2 ♀.

37. *CULICAPA CEYLONENSIS* (SWAINS).

Gunong Angsi, 1,500-2,500 feet.

38. *ABRORNIA SCHWANERI* (TEMM.).

Bukit Lantai. 3 ♂.

39. *PERICROCOTUS FLAMMIFER*, HUME.

Bukit Tangga. 1 ♂; 5 ♀.

Bukit Lantai. 1 ♀.

40. *ÆTHORHYNCHUS LAFRESNAYEI* (HARTL.).

Bukit Tangga. 1 ♂.

41. *CHLOROPSIS ZOSTEROPS* (VIG.).

Bukit Tangga. 2 ♀.

Bukit Lantai. 2 ♂.

42. *CHLOROPSIS KTEROCEPHALA* (LESS.).

Bukit Tangga. 6 ♂; 7 ♀.

Bukit Lantai. 2 ♂; 2 ♀.

Gunong Angsi, 1,500-2,500 feet.

43. *IRENA CYANEA*, BEGGIE.

Bukit Tangga. 4 ♂; 1 ♀.

Bukit Lantai. 3 ♂.

Gunong Angsi, 1,500-2,500 feet.

44. *HEMIXUS CINEREUS* (BLATH).

Bukit Lantai. 4 ♂; 3 ♀.

45. *HEMIXUS MALACCENSIS* (BLYTH).

Bukit Tangga. 1 ♂.

Bukit Lantai. 3 ♂ ; 3 ♀.

46. *IOLE OLIVACEA*, BLYTH.

Bukit Lantai. 1 ♀.

47. *CRINIGER OCHRACEUS*, MOORE.

Bukit Lantai. 1 ♂.

48. *ALOPHOIXUS PHEOCEPHALUS* (HARTL.).

Bukit Tangga. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

49. *TRICHOLESTES CRINIGER* (BLYTH).

Bukit Tangga. 2 ♂.

Bukit Lantai. 1 ♂ ; 2 ♀.

50. *PYCNONOTUS FINLAYSONI* (STRICKL.).

Bukit Tangga. 2 ♂.

51. *PYCNONOTUS SALVADORII*, SHARPE.

Bukit Lantai. 1 ♂.

52. *RUBIGULA CYANIVENTRIS* (BLYTH).

Bukit Tangga. 2 ♂.

Gunong Angsi, 1,500-2,500 feet.

53. *EUPETES MACROCERCUS* (TEMN.).

Bukit Tangga. 2 ♂.

The curious Bare-necked Ground-Babbler is not common in collections: it is probably more numerous than would appear, however, for owing to its dull colouring, shy nature and terrestrial habits, it is likely to escape observation.

54. *POMATORRHINUS BORNEENSIS*, CAR.

Bukit Tangga. 1 ♀.

Bukit Lantai. 5 ♂ ; 2 ♀.

55. *TURDINUS SEPIARIUS* (HORSF.).

Bukit Tangga. 1 ♂.

56. *TURDINUS MAGNIROSTRIS*, MOORE.*Malacopteron magnirostre*, Robinson, *op. cit.*, p. 27.

Bukit Tangga. 2 ♀.

Bukit Lantai. 1 ♂ ; 1 ♀.

57. *TURDINUS MACRODACTYLUS*, STRICKL.

Bukit Tangga. 1 ♂.

58. *DRYMOCATAPHUS NIGROCAPITATUS* (EYTON).

Bukit Tangga. 2 ♂.

59. *SETARIA MAGNA*, EYTON.

Bukit Tangga. 2 ♂.

60. *ANUROPSIS MALACCENSIS*, HARTL.

Bukit Tangga. 1 ♀.

Bukit Lantai. 1 ♂.

61. *ALCIPPE CINEREA*, BLYTH.

Bukit Tangga. 1 ♂.

Bukit Lantai. 4 ♂; 3 ♀.

62. *STACHYRIS DAVISONI*, SHARPE.

Bukit Tangga. 1 ♂.

Bukit Lantai. 1 ♀.

Gunong Angsi, 1,500-2,500 feet.

63. *STACHYRIS POLIOCEPHALA* (TEMN.).

Bukit Tangga. 1 ♂; 2 ♀.

64. *STACHYRIS LEUCOTIS* (STRICKL.).

Bukit Lantai. 2 ♂.

Gunong Angsi, 1,500-2,600 feet.

65. *STACHYRIS MACULATA* (TEMN.).

Bukit Tangga. 1 ♂.

66. *MACRONUS PTILOSUS*, JARD. & SELBY.

Bukit Tangga. 1 ♂.

67. *MIXORNIS GULARIS* (RAFFLES).

Bukit Tangga. 1 ♂.

68. *HERPORNIS ZANTHOLEUCA*, HODGK.*Herpornis xantholeuca*, Robinson, loc. cit.

Bukit Tangga. 1 ♂; 1 ♀.

Bukit Lantai. 3 ♂; 1 ♀.

69. *HYDROCICHLA RUFICAPILLA* (TEMN.).

Bukit Tangga. 2 ♀.

Bukit Lantai. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

HYDROCICHLA FRONTALIS (BLYTH).

Gunong Angsi, 1,500-2,500 feet.

70. *CITTOCINCLA MACBURA* (GM.).

Bukit Tangga. 1 ♂.

Bukit Lantai. 1 ♀.

Gunong Angsi, 1,500-2,500 feet.

71. *ORTHOTOMUS ATRIGULARIS* (TEMN.).

Bukit Lantai. 1 ♂.

72. *ACANTHOPNEUSTE BOREALIS* (BLAS.).

Gunong Angsi, 1,500-2,500 feet.

73. *HEMIPUS PICATUS* (SAYES).

Bukit Tangga. 1 ♂.

Bukit Lantai. 2 ♂; 1 ♀.

74. *TEPHRODORNIS GULARIS* (RAFFLES).

Bukit Lantai. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

75. *LANIUS TIGRINUS*, DRAP.

Gunong Angsi, 1,500-2,500 feet.

76. *PLATYLOPHUS ARDESIACUS*, CAR.

Bukit Tangga. 1 ♂.

Bukit Lantai. 1 ♂.

77. *MELANOCHLORA FLAVOCRISTATA* (LAFR.).

Bukit Lantai. 2 ♂; 2 ♀.

78. *DENDROPHILA SATURATION*, HARTERT.

Bukit Tangga. 2 ♂.

Bukit Lantai. 2 ♂.

These examples all illustrate the greater richness of colour possessed by the Peninsular Nuthatch as compared with *D. frontalis* of Java.

79. *DISSEMURUS PARADISEUS* (LINS.).

Bukit Tangga. 1 ♂.

Bukit Lantai. 2 ♂; 1 ♀.

80. *ORIOLUS ZANTHONOTUS*, HORAF.

Bukit Tangga. 1 ♂.

Gunong Angsi, 1,500-2,500 feet.

81. *MUNIA LEUCOGASTRA* (BLYTH).

Bukit Tangga. 2 ♂; 2 ♀.

The White-bellied Munia was not uncommon on the roadside in the Bukit Tangga Pass, but as noted elsewhere it has only once been obtained of recent years during much collecting in the Western States.

82. *ANTHOTHREPTES SIMPLEX*, S. MÜLL.

Bukit Lantai. 1 ♂.

83. *ARACHNOTHERA MODESTA*, EYTON.

Bukit Tangga. 2 ♂.

84. *ARACHNOTHERA ROBUSTA*, M. & S.

Bukit Lantai. 2 ♂.

85. *ARACHNOTHERA CRASSIROSTRIS* (REICHENB.).

Bukit Lantai. 1 ♀.

86. *PRIONOCHILUS MACULATUS*, TEMM.

Bukit Lantai. 2 ♀.

NOTES ON BIRDS NEW TO, OR RARE IN, THE MALAY PENINSULA.

(SECOND SERIES.)

By C. BODEN KLOSS, F.Z.S., M.B.O.U.

SINCE the first series of these notes was issued in the last number of this Journal, the Federated Malay States Museums have undertaken an expedition to Trang, Siamese Malaya, which has resulted in the addition of a large number of rare and interesting species to their collections and the results have been dealt with at length in papers to be found in the "Ibis" for October, 1910, and January, 1911.

The species now commented on have been obtained in the ordinary way of collecting at various localities in the Federated Malay States.

GALLINAGO MEGALA, SWINH.

Gallinago megala, Sharpe, *Cat. Birds Brit. Mus.*, xxiv., p. 479 (1896); Robinson, *Journ. F.M.S. Mus.*, iv., p. 180 (1909).

Since the first specimen was recorded by Robinson from the neighbourhood of Kuala Lumpur in 1909, Seimund has obtained two more examples in the vicinity of Taiping, Perak. Now that the species is known to occur here it will probably be noticed in fair numbers in future.

MILVUS GOVINDA, SYKES.

Milvus govinda, Sharpe, *Cat. Birds Brit. Mus.*, i., p. 325 (1874); Blanford, *Faun. Brit. Ind. Birds*, iii., p. 374 (1895).

The common Pariah Kite has not often been recorded from the Malay Peninsula; an example was shot near Taiping, Perak, in November, 1910, and it has been obtained in Penang (Cantor), Singapore (Kelham), and near Klang by Davison.

SYRNIUM MAINGAYI, HUME.

Syrnium maingayi, Hume, *Stray Feathers*, vi., p. 27 (1878); Blanford, *Faun. Brit. Ind. Birds*, iii., p. 276 (1895).

An example of the rare Malayan Wood-Owl was shot in the Semangko Pass, 2,700 feet, in April, and in June, 1910, another was obtained near Taiping by Seimund. Specimens from Kuala Tembeling, Pahang; Ginting Bidei, 2,300 feet, Selangor; and from Trang, Siamese Malaya, had previously been in the collections of the Federated Malay States Museums.

PHALACROCORAX CARBO, LINN.

Phalacrocorax carbo, Blanford, *Faun. Brit. Ind. Birds*, iv., p. 340 (1898); Grant, *Cat. Birds Brit. Mus.*, xxvi., p. 340 (1898).

The Cormorant is exceedingly rare in the southern half of the Malay Peninsula. A specimen was collected by Wray on the Batang Padang River near Tapah, South Perak, about fifteen years ago; a second example was obtained by Kloss on a fresh-water pond at Johore Bahru in 1904, and in July, 1910, Seimund shot a third on the small lake at Taiping, Perak. North of the Kelantan River on the East Coast and in Patani Bay it is not uncommon.

PELECANUS PHILIPPENSIS, GR.

Pelecanus philippensis, Blanford, *Faun. Brit. Ind. Birds*, iv., p. 335 (1898); Grant, *Cat. Birds Brit. Mus.*, xxvi., p. 471 (1898).

A single example of the Spotted-billed Pelecan was taken near Taiping, Perak, some years ago, and in July, 1910, a second individual was obtained in the same locality.

ALCEDO EURYZONA, TEMM.

Alcedo euryzona, Sharpe, *Cat. Birds Brit. Mus.*, xvii., p. 154 (1892); Blanford, *Faun. Brit. Ind. Birds*, iii., p. 126 (1895); Robinson, *Journ. F.M.S. Mus.*, ii., p. 172 (1909).

The Broad-zoned Kingfisher is a rare bird in the Federated Malay States and has long been represented in its Museums by a single female captured by Wray on the Larut Hills near Taiping, Perak. In December, 1909, three examples were collected in the mountains forming the Trang-Patelung boundary; in 1910 a fifth was obtained near Kuala Lipis, and a sixth near Bentong, Pahang, while the last collected to date was shot in the mountains of Negri Sembilan about 15 miles N.-E. of Seremban by Mr. V. Knight.

GERYGONE MODIGLIANII, SALVAD.

Gerygone modiglianii, *Salvad., Ann. Mus. Civ. Genov.* (2), xii., p. 71 (1891); *Robinson, Hand-list of Birds of the Malay Peninsula*, p. 13, note (1910).

Gerygone pectoralis, *Davison, Ibis*, 1892.

A pair of these little Grey-and-yellow Flycatchers was obtained in the grounds of the Perak Museum at Taiping in September, 1909. The species is decidedly rare in the Peninsula, being known previously by single examples from Kuala Pahang, Gunong Tahan and from Trang, Siamese Malaya.

RHINOMYIAS PECTORALIS (SALVAD.).

Rhinomyias pectoralis, *Hartert, Nov. Zool.*, ix., p. 553 (1902); *Robinson, Hand-list of Birds of the Malay Peninsula*, Kuala Lumpur, 1910.

This Brown Flycatcher is not common in the Peninsula. A specimen was shot at Kuala Lipis in May of this year and it has previously been obtained in Pahang by Waterstradt on Gunong Tahan and Robinson at Kuala Teku. The Museums have also a few specimens from Perak and Selangor.

PYCNONOTUS ROBINSONI, OGILVIE-GRANT.

Pycnonotus robinsoni, *Ogilvie-Grant, Fasciculi Malayenses, Zool.*, iii., *Report on the Birds*, p. 85 (1905).

An adult female of this species, previously only known by two examples from Patani, was obtained in December, 1909, at Chong, Trang, and was overlooked when the "Ibis" paper already referred to was drawn up.

This Bulbul approaches *P. blanfordi* and differs from *P. plumosus*, which occurs in the same localities, in the possession of pale and dull upper-parts, faint greenish edges to the wing feathers, yellowish-white throat and under-parts and in a somewhat rounded culmen to the bill. It was originally compared with *P. cinereifrons* from Palawan Island but more nearly resembles *P. blanfordi*, of which it is probably the Malayan representative, apparently differing only in having the silvery-white area of cheeks and ear coverts slightly reduced in extent.

KENOPIA STRIATA (BLYTH).

Kenopia striata, *Sharpe, Cat. Birds Brit. Mus.*, vii., p. 573 (1883); *Hartert, Nov. Zool.*, ix., p. 567 (1902).

The White-flecked Babbler is not often met with in the Peninsula. Abbott obtained it in Trang, Siamese Malaya, in 1899 (where the F.M.S. Museums also got a specimen in 1910). Waterstradt on Gunong Tahan two years later, Kloss shot one individual near Gunong Pulai, S. Johor, in 1904, and in July, 1909, Robinson and Kloss trapped another example at Temengoh, Upper Perak. No others seem to have been recorded for many years.

PETROPHILA CYANEA (LINN.).

Petrophila cyanea, *Blanford, Faun. Brit. Ind. Birds*, vol. ii., p. 146 (1898); *Petrophila cyaneus*, *Robinson, Journ. F.M.S. Mus.*, vol. ii., No. 4, 1909, p. 207.

A male was obtained at the Batu Caves near Kuala Lumpur by Kloss in August, 1908, and on 24th May, 1910, a second specimen, a female, was shot at the same place by Mr. C. B. Holman-Hunt.

NOTODELA LEUCURA (HODGES)

Notodela leucura, *Sharpe, Cat. Birds Brit. Mus.*, vii., p. 23 (1883); *Robinson, Hand-list of the Birds of the Malay Peninsula*, p. 17, note (1910); *Oates, Faun. Brit. Ind. Birds*, i., p. 113 (1889).

Until recently the White-tailed Blue Robin was known from the Peninsula by a single specimen collected by Butler on the Larut Hills, Perak. In August, 1909; specimens were for the second time obtained in the Peninsula from the same locality by Robinson and Kloss.

LANIUS BENTET (HORST)

Lanius bentet, *Gadow, Cat. Birds Brit. Mus.*, viii., p. 263 (1883); *Oates, Faun. Brit. Ind. Birds*, i., p. 465 (1889); *Robinson, Hand-list of Birds of the Malay Peninsula*, p. 17, note (1910).

This handsome Long-tailed Shrike is an exceedingly rare bird in the Malay Peninsula and until Seimund shot four specimens near Kuala Lumpur in December, 1909, was unrepresented in the F.M.S. Museums.

MUNIA LEUCOGASTRA (BLYTH).

Uroloncha leucogastra, *Sharpe, Cat. Birds Brit. Mus.*, xiii., p. 362 (1890); *Oates, Faun. Brit. Ind. Birds*, ii., p. 186 (1890); *Hartert, Nov. Zool.*, ix., p. 578 (1902); *Grant Journ. F.M.S. Mus.*, iii., p. 17 (1908).

The White-bellied Munia was lacking from the F.M.S. Museums collections until a specimen was obtained at Temengoh, Upper Perak, in August, 1909. Since then it has been taken in Negri Sembilan but it appears to be uncommon in the Western States; though it has turned up in large numbers from the lowlands of Pahang.

ON FIVE NEW SUB SPECIES OF ORIENTAL SQUIRRELS.

BY HERBERT C. ROBINSON, C.M.Z.S., AND R. C. WROUGHTON, F.Z.S.

*(Published by permission of the Trustees of the British Museum.)*SCIURUS EPOMOPHORUS MILLERI, *subsp. nov.*

A LOCAL form of *S. epomophorus* differing from the more northern *Sc. e. davisoni* in its paler general colouring.

Size rather smaller than typical *Sc. epomophorus* and *Sc. e. davisoni*, but with a relatively longer tail.

GENERAL COLOUR.—Above, yellowish olive, below “drab-grey.” Individual hairs of back (15 mm. long) having basal $\frac{1}{3}$ black, median $\frac{1}{3}$ buffy white with a faint narrow median blackish ring, terminal $\frac{1}{3}$ black with a median buffy ring (2 mm. wide). Neck and flank patches “buff.” Individual hairs of tail, 35 mm. long whitish buffy with four rings and tip (4-5 mm. wide) black, extreme tip of tail black. Hands and feet coloured like back but the pale element pure white in place of buffy-white.

SKULL.—As in typical *epomophorus*.

DIMENSIONS OF THE TYPE.—Head and body, 237; tail, 212; hind-foot, 47 mm.

SKULL.—Greatest length, 54; basilar length, 41; zygomatic breadth, 32; nasals, 16; interorbital breadth, 19; upper molar series, 11 mm.

HABITAT.—Trang, Siamese Malay States (West Coast).

Very many specimens from localities ranging from Trang southwards to Kedah (*Flower coll.*) but exact northern, southern and eastern limits not yet determined.

TYPE.—Adult male: B.M. No. 0.10.4.5. Collected by Dr. W. L. Abbott, 20th February, 1896.

REMARKS.—In this form the neck and flank patches are almost as distinctly marked as in the typical *Sc. epomophorus* from the island of Salanga and the adjacent coast, though in a much paler shade of colour. In *Sc. e. davisoni* these patches are much less distinct while in *Sc. e. fluminalis* the flank patches are scarcely appreciable though the neck ones are well marked.

SCIURUS EPOMOPHORUS FLUMINALIS, *subsp. nov.*

A local form of *Sc. epomophorus*, still paler than the last and with a proportionately longer tail.

Size rather larger than the Trang form.

GENERAL COLOUR.—Above olive-grey, below whitish-grey, almost white on the chest. Individual hairs of back (50 mm. long), basal $\frac{1}{3}$ black, median $\frac{1}{3}$ buff, terminal $\frac{1}{3}$ black with a white ring (2 mm. broad). Neck and flank patches “buff.”

Tail like back, strongly tipped with black, hands and feet paler than in *Sc. e. milleri*, the fingers and toes silvery white.

SKULL.—Larger than in any member of the group that we have seen.

DIMENSIONS OF THE TYPE.—Head and body, 234; tail (*c*) 270; hind-foot, 50 mm.

SKULL.—Greatest length, 59; basilar length, 46.5; zygomatic breadth, 33; nasals 17; interorbital breadth, 20; upper molar series, 11 mm.

HABITAT.—N. Siam (Type from Meping rapids, alt. 600 feet).

TYPE.—Adult male: B.M. No. 7.11.13.17. Collected and presented to the British Museum by T. H. Lyle, Esq.

SPECIMENS EXAMINED.—Four.

SCIURUS CASTANEIVENTRIS BONHOTI, subsp. nov.

Size rather large.

GENERAL COLOUR.—Above a fine tawny grizzle; below chestnut. Face, hands and feet like back, but grizzle finer. Tail like back, but grizzle becoming rapidly coarser and developing distally into a transverse barred pattern, black and tawny.

DIMENSIONS OF THE TYPE.—(Measured on the skin.) Head and body, 270; tail, 200; hind-foot, 54; ear, 24 mm.

SKULL.—Greatest length, 52; greatest breadth, 34; nasals, 16; diastema, 12.5; upper molar series, 11 mm.

HABITAT.—Szechuen, China (Type from Chin Chien San).

TYPE.—Adult female: B.M. No. 8.8.11.25. Collected and presented to the British Museum by Mr. F. W. Styan.

SCIURUS CASTANEIVENTRIS MICHIANUS, subsp. nov.

Size rather smaller.

GENERAL COLOUR.—Above a grey grizzle, giving the general effect of "hair brown"; below "hazel." Face, hands and feet coloured like the back; ears like the belly. Tail like back but the grizzle growing coarser, until it constitutes in the distal half an indistinct transverse black and yellowish barred pattern, the tip black but disguised by the long white tips of the terminal hairs.

SKULL.—Small and slenderly built, teeth small.

DIMENSIONS OF THE TYPE.—(Measured on the skin.) Head and body, 240; tail, 180; hind-foot, 50; ear, 25 mm.

SKULL.—Greatest length (*c*) 50; greatest breadth (*c*) 30; nasals, 15.5; diastema, 11.5; upper molar series, 9.5 mm.

HABITAT.—Yunnan, South China (Type from Mee Chee).

TYPE.—Adult female: B.M. No. 8.11.14.18. Collected on 5th January, 1908, and presented to the British Museum by Mr. F. W. Styan.

SCIURUS NOTATUS BALSTONI, subsp. nov.

A local race of the Javanese *Sc. notatus* from which it is distinguished by the darker colouring above and the brighter colouring of the lower surface and by a broad pale ring round the eye not present in the typical *Sc. notatus* from Western Java.

SIZE AND GENERAL COLOUR.—As in typical *Sc. notatus* but darker above; below “pinkish-buff,” but as the hairs have long black bases, the colouring much disguised except on inner sides of limbs where the hairs are entirely buff. A broad “pinkish-buff” ring round the eye, extending downwards over the cheek. Hands and feet sparsely clothed with white tipped hairs as in true *Sc. notatus*.

DIMENSIONS OF THE TYPE.—(Measured in the flesh). Head and body, 215; tail, 173; hind-foot, 45; ear, 22 mm.

SKULL.—Greatest length, 49; basilar length, 39; zygomatic breadth, 28; nasals, 14; interorbital breadth, 16; braincase breadth, 22; diastema, 12; upper molar series, 9.6 mm.

HABITAT.—Southern Central Java (type from Tjilatjap).

TYPE.—Adult male: B.M. No. 9.1.5.706, Original Number 603, collected by Mr. G. C. Shortridge on 16th October, 1907, and presented to the British Museum by Mr. W. E. Balston.

REMARKS.—All the old names for *Sc. notatus*—viz., *badjing*, *plantani* and *bilineatus*—were directly or indirectly based on Pennant's *Plantain Squirrel* from Batavia and Princes Island. Horsfield was no doubt dealing with the present race as he mentions the eyepatch, but he called it *plantani*. While therefore the form from Batavia must be called *notatus* that from South Central and probably Eastern Java has so far remained unnamed.

A LIST OF A SMALL COLLECTION OF MAMMALS AND BIRDS FROM THE MOUNTAINS OF ULU LANGAT, SELANGOR.

By H. C. ROBINSON, C.M.Z.S., M.B.O.U.

UNTIL the present collection was made the southern limit of what has been termed the Himalayo-Sondaic element in the fauna of the Malay Peninsula had been placed at the Ginting Bidei Pass leading across the Main Range of the Peninsula from Selangor to Pahang, at an elevation of about 2,300 feet. On the mountains north of this line, above 3,000 feet, the dominant species of birds are of Himalayan or Sumatran facies, while further to the south on the hills of Negri Sembilan and on Mount Ophir on the Johore-Malaccan border, which approach or slightly exceed 4,000 feet, such forms are entirely absent.

The Massif on which the present collection was made at elevations slightly under and over 4,000 feet lies to the south-west of Ginding Bidei and attains in Bukit Nuang a maximum height of about 4,900 feet.

The actual locality visited was on the head-waters of the Langat river near the summit of a mountain known to the local Sakais as Menang Gasing. Five of the Dyak collectors of the Museums spent ten days there at the end of May and the commencement of June, 1911.

MAMMALS.

1. RATUFA MELANOPEPLA, MILLER.

Ratufa melanopepla, Miller, "Proc. Acad. Sci. Washington," ii, p. 71 (1900).

2 ♀.

These specimens agree well with a series of topotypes from Trang in the western Siamese Malay States. The species is not usually found at such an altitude as 4,000 feet.

2. SCIURUS NIGROVITTATUS JOHORENSIS, ROB. AND WROUGHT.

Sciurus nigrovittatus johorensis, Rob. and Wrought. ante, p. 166.

1 ♀.

Practically identical with the types of the sub-species from Southern Johore.

3. SCIURUS MINIATUS, MILLER.

Sciurus notatus miniatus, Miller, "Proc. Acad. Sci. Washington," ii, p. 79 (1900).

2 ♀.

Not differing from Trang topotypes.

4. SCIURUS TENTIN TAHAN, BONHOTE.

Sciurus tahan, Bonhote, "Journ. Fed. Malay States Mus.," iii, p. 6 (1908).

2 ♀.

Inseparable from a large series from the type locality and from more northern sections of the Selangor Main Range.

5. SCIURUS MACCLELLANDI NOVENLINEATUS, MILLER.

Sciurus novemlineatus, Miller, "Proc. Biol. Soc. Washington," xvi, p. 147 (1903).

2 ♂, ♀.

This is the most southerly locality from which any form of this wide-spread species has been obtained. The locality, Malacca, which is assigned to it by Bonhote is almost certainly erroneous, except in the most generalised sense.

6. MUS CILIATUS, BONHOTE.

Mus ciliatus, Bonhote, P. Z. S. 1900, p. 879, pl. xvi.

2 ♂.

This species is only met with at considerable elevations and is on record from Gunong Inas (Perak), Gunong Mengkuang Lebah and Bukit Kutu (Selangor) and Gunong Tahan (Pahang), in each case from considerably above 3,000 feet. It is closely allied to *Mus edwardsi*, Thos., from Fokien, China.

7. MUS VOCIFERANS, MILLER.

Mus vociferans, Miller, "Proc. Biol. Soc. Washington," xiii, p. 1888 (1900).

A single female specimen.

This rat occurs everywhere in the Peninsula from as far north as has been zoologically explored to the extreme south and from sea level

to about 5,000 feet. The present case, however, is the only one in which it has been found associated with the preceding species from which it is nevertheless extremely distinct.

8. *MUS PELLAX*, MILLER.

Mus pellax, Miller, loc. cit, supra, p. 147.

A single female.

Widely distributed throughout the Peninsula, but not nearly so common as *Mus surifer*, Miller.

9. *TUPAIA FERRUGINEA FERRUGINEA*, RAFFLES.

Tupaia ferruginea, Raffles, "Trans. Linn. Soc.," xiii, p. 256 (1822).

1 ♂.

10. *HYLOMYS SUILLUS*, MÜLLER AND SCHLEGEL.

Hylomys suillus, Müll. and Schleg. "Verhandl. Mamm.," p. 153, pl. xxv, figs. 4-7, pl. xxvi, fig. 1 (1839-44).

A single female of this extremely rare insectivore was trapped but was almost destroyed by ants leaving little but a portion of the dorsal skin and the skull. It appears to lack the median dorsal stripe which is generally present in Bornean examples. The species is generally credited to the Malay Peninsula but we are unaware of the existence of any specimen from localities south of Southern Tenasserim, where it has been obtained by Dr. W. L. Abbott (*Lyon, Proc. U. S. Nat. Mus.*, xxxvi, p. 456, pl. 36 (1909)).

BIRDS.

* 1. *ARBORICOLA CAMPBELLI*, ROBINSON.

Arboricola campbelli, Robinson, "Journ., Fed. Mal. States. Mus.," ii., p. 167 (1909).

A pair.

2. *MACROPYGIA RUFICEPS* (TEMN.)

Op. cit. p. 170.

1 ♂.

3. *NYCTIORNIS AMICTA* (TEMN.)

Robinson, *op. cit.* p. 173.

* 4. *PYROTROGON ERYTHROCEPHALUS* (GOULD).

Op. cit. p. 176.

1 ♀.

5. *CYANOPS MYSTACOPHANES* (TEMN.).

Op. cit. p. 179.

1 ♂.

* 6. *CYANOPS OORTI* (MÜLLER).

Op. cit. p. 179.

2 ♂ ; 1 ♀.

* 7. *PSILOPOGON PYROLOPHUS* (MÜLLER).

Op. cit. p. 180.

1 ♂ imm.

* 8. *GEVINUS RODGERI*, HARTERT & BUTLER.*Op. cit.* p. 180.

1 ♂; 1 ♂ imm.

9. *PYRRHOPICUS PORPHYROMELAS* (BOIE).*Op. cit.* p. 182.

1 ♂.

10. *CHRYSOPLAGMA HUMIL*, HARTERT.*Op. cit.* p. 183.

1 ♀.

11. *CALYPTOMENA VIRIDIS*, RAFFLES.*Op. cit.* p. 184.

1 ♀.

† 12. *PSARISOMUS DALHOUSIAE* (JAMESON).*Op. cit.* p. 184.

1 ♂; 1 ♀.

+ 13. *SERILOPHUS ROTHSCCHILD*, HARTERT & BUTLER.*Op. cit.* p. 185.

1 ♀.

Since the date of my paper quoted above we have obtained additional specimens of this beautiful Broadbill at Temengoh, in Upper Perak, at comparatively low elevations not exceeding 500 feet.

* 14. *ANTHITES MALAYANA*, SHARPE.*Op. cit.*, p. 188.

6 ♂.

* 15. *NILTAVA GRANDIS DECIPIENS*, SALVAD.*Op. cit.*, p. 188.

1 ♂, 1 ♀.

* 16. *CRYPTOLOPHA BUTLERI*, HARTERT.*Op. cit.*, p. 191.

1 ♀.

This species seems widely though sparsely distributed throughout the length of the Peninsular Main Range. In addition to the specimens recorded above we possess a skin collected at Telom, 3,500 feet, on the Perak-Pahang boundary in November, 1908.

17. *ABBOENIS SCHWANERI* (TEMN.).*Op. cit.*, p. 191.

1 ♀.

Widely distributed throughout the length of the Main Range from its foot to over 4,000 feet.

* 18. *ARTAMIDES LARUTENSIS*, SHARPE.*Op. cit.*, p. 192.

1 ♂.

* 19. *PERICROOTUS MONTANUS*, SALVAD.*Op. cit.*, p. 192.

1 ♂, 1 ♀, 1 ♂ imm., 1 ♀ imm.

* 20. CHLOROPSIS HARDWICKII, JARD. & SELBY.

Op. cit., p. 193.

1 ♂.

21. HEMIXUS CINEREUS (BLATH).

Op. cit., p. 193.

1 ♂.

* 22. IOLE TICKELLI PARACENSIS, HARTERT & BULLER.

Iole peracensis, *op. cit.*, p. 194.

1 ♂.

23. CRINIGER OCHRACEUS, MOORE.

Op. cit., p. 195.

1 ♀.

* 24. TROCHALOPTERON PENINSULAE, SHARPE.

Op. cit., p. 197.

2 ♂ : 1 ♀.

* 25. MELANOCHLA LUGUBRIS (MÜLLER.)

Op. cit., p. 197.

1 ♂ : 2 ♀.

* 26. POMATORHINUS WRAYI, SHARPE.

Op. cit., p. 197.

1 ♀.

* 27. RHINOCHLA MITRATA (MÜLLER).

Op. cit., p. 197.

1 ♂.

* 28. TURDINUS LORICATUS (MÜLLER).

Op. cit., p. 199.

1 ♂.

In the Peninsula this species has hitherto only been found in Selangor between 2,000 and 4,000 feet.

* 29. TURDINUS GRANTI RICHMOND.

Op. cit., p. 201.

1 ♂.

* 30. CORYTHOCHLA LEUCOSTICTA, SHARPE.

Op. cit., p. 201.

1 ♂ ; 1 ♀.

* 31. ALATPE PERACENSIS, SHARPE.

Op. cit., p. 201.

1 ♂ ; 2 ♀.

* 32. PSEUDOMINLA SOROR, SHARPE.

Op. cit., p. 201.

1 ♀.

* 33. STACHYRIS DAVIDSONI, SHARPE.

Op. cit., p. 202.

1 ♂ ; 1 ♀.

* 34. STACHYRIS CHRYSOPS, RICHMOND.

Stachyris chrysaea bocagei, *op. cit.*, p. 202.

4 ♂.

* 35. BRACHYPTERYX WRAYI, GRANT.

Op. cit. p. 204.

2 ♂, 2 ♀.

* 36. SIBIA WRAYI, GRANT.

Sibia wrayi, Grant, Bull. B.O.C. xxv, p. 98 (1910).*Sibia simillima*, Robinson, *op. cit.* p. 204.

1 ♂.

* 37. SIVA SORDIDIOR, SHARPE.

Op. cit. p. 204.

1 ♂.

* 38. PTERYTHIUS TAHANENSIS, HARTERT.

Op. cit. p. 205.

1 ♀.

* 39. MESIA ARGENTAEURIS, HODGSON.

Op. cit. p. 205.

3 ♂.

* 40. PNOEPYGA LEPIDA, SALVAD.

Op. cit. p. 205.

1 ♂.

11. CITROCNCLA MACRURA (GM.).

Op. cit. p. 208.

1 ♀ imm.

12. SUTORIA MACULICOLLIS (F. MOORE).

Op. cit. p. 208.

1 ♂.

* 43. DENDROPHILA AZUREA (LESS.).

Op. cit. p. 210.

1 ♂.

* 44. CISSA ROBINSONI, GRANT.

Op. cit. p. 210.

2 ♀.

The Blue Hunting-crow has now been found to be distributed over all the high mountains of the Federated Malay States at elevations exceeding 3,500 feet.

* 45. BHRINGA REMIFER (TEMN.).

Op. cit. p. 211.

1 ♂; 1 ♀.

* 46. ORIOLUS CONSANGUINEUS, WARDL-RAHE.

Op. cit. p. 211.

1 ♂; 1 ♀.

* 47. AETHOPYGA WRAYI, SHARPE.

Op. cit. p. 212.

1 ♂.

48. ARACHNOTHERA LONGIROSTRIS (LATH.).

Op. cit. p. 213.

1 ♂.

Op. cit. p. 214.

3 ♂.

Out of the 49 species of birds procured, 33 (marked with an asterisk) are strictly confined, so far as the Peninsula is concerned, to the zone above 3,000 feet, while three (marked with a dagger) are of only accidental occurrence below that limit. Of the remainder, six may be classed as submontane while only seven are generally met with at low elevations.

Compared with the list of 86 species from the hills of Negri Sembilan (*antea*, p. 219) it will be observed that only ten species—*viz.* :

Macropygia ruficeps	Calyptomena viridis
Nyctiornis amicta	Abornis schwaneri
Chotorhea mystacophanes	Hemixus cinereus
Pyrhopicus porphyromelas	Stachyris davisoni
Chrysophlegma humei	Cittocinclla macrura

are common to both lists, while of these 10 species, seven are low-land species, three are submontane and none are high elevation forms.

It is, therefore, I think, fairly evident that at some comparatively recent time a barrier has existed between the mountains of Southern Selangor and their continuation in Negri Sembilan, sufficient to prevent the extension of the dominant continental and Sumatran form southwards. It is evident, also, that this barrier must have been a substantial one, as wide stretches of low country separating the Gunong Tahan Ranges from the backbone of the Peninsula have not sufficed to effect any specific differentiation in the fauna of the two ranges.

Such evidence as is afforded by the small number of mammals found at high elevations also bears out the same contention.

ON NEW MAMMALS FROM THE MALAY PENINSULA AND ADJACENT ISLANDS.

BY HERBERT C. ROBINSON, C.M.Z.S., AND C. BODEN KLOSS, F.Z.S.

1. HIPPOSIDEROS RIDLEYI, *sp. nov.*

TYPE.—Adult male in spirit with extracted skull. No. 2068/11, Selangor Museum. Collected in the Botanic Gardens, Singapore, by H. N. Ridley, Esq., in June, 1911.

CHARACTERS.—A saucer-shaped disc in front of the nostrils above the horizontal nose leaf. No supplementary nose leaves on the sides of muzzle.

COLOUR.—Dried from spirit. Hairs of pelage about 10 mm. in length, the tips dark-brown, the bases dull brownish-white for two-thirds the length. Fur extending on to the wing membranes, above and below, for about 7 mm. from the sides of the body. Membranes, sooty-brown to black, inferior edge of the antebrachium narrowly edged with dull yellow.

NOSE-LEAF.—Anterior horizontal nose-leaf covering the end of the muzzle, slightly emarginate at the front and at the sides, sinuous in section, broadest posteriorly. Nostrils surrounded by laminae; in front of and between the nostrils a concave circular disc connected with the front of the leaf and the base of the sella by low ridges of membrane. Sella broadly cordiform, narrower than the nose leaves, with slight wart-like prominences along its upper edge, the centre slightly projecting, the base with a faintly bisected concavity. Hinder-nose-leaf with rounded margin, the front surface concave and divided vertically into four cells; posterior surface with a broad projecting fold of skin.

A broad frontal glandular sac, situated between two warty prominences.

EARS.—Ears broad, the tips rectangular, outer margin very slightly concave below the tips, then slightly convex, the outer edges strongly folded near the base; extending to the end of muzzle when laid forward and connected by a low ridge of skin.

WINGS AND MEMBRANES.—Wings from the tarsus; interfemoral membrane concave between the extremities of the calcanea, extreme tip of tail free.

SKULL AND TEETH.—Skull most nearly resembles that of *H. bicolor* but is more elongate, the zygomata relatively narrower, the sagittal crest less developed and the nasal swellings more dilated. P² is more developed and is situated well within the tooth-row: it is relatively much larger than the same tooth in *H. galeritus*.

MEASUREMENTS (from spirit specimen).—Head and body, 49; tail, 24; hind-foot, 7.8; tibia, 19.5; fore-arm, 47.2; third metacarpal, 34; fourth metacarpal, 35.4; fifth metacarpal, 35 mm.

Breadth of posterior nose leaf, 9.0; breadth of sella, 7.8; breadth of horizontal nose leaf, posteriorly, 8.2; anteriorly, 4.3; height of posterior nose leaf from crown, 2.75; height of sella from base, 3.7; greatest length of horizontal nose leaf, 6.75; diameter of nasal disc, 3.0. Length of ear, 22; breadth, 17 mm. Cranial measurements: total length, 19.7; mastoid width, 10.8; width of brain-case, 8.8; zygomatic width, 9.6; maxillar width, 6.8; anteorbital width, 6.1; width across cingula of canines, 4.3; length of upper tooth-row, including canine, 6.8 mm.

SPECIMENS EXAMINED.—One (the type).

REMARKS.—The nasal disc separates this species from all others of the genus though the absence of supplementary leaves on the muzzle allies it to *H. bicolor* and *H. doriae*.

TUPAIA FERRUGINEA PENANGENSIS, *subsp. nov.*

TYPE.—Adult male (skin and skull). No. 1445/11, Selangor Museum.

Collected at Telok Bahang, Penang Island, on the 2nd April, 1911, by E. Seimund.

CHARACTERS.—Smaller than *T. ferruginea ferruginea* and duller and paler above: differs from *T. f. wilkinsoni* and other northern races in having the ferruginous tint of the back extending on to the shoulders.

COLOUR.—Upper-surface grizzled black and ferruginous, somewhat olivaceous on the head and nape. Shoulder stripes, well marked, yellowish buff. Under-surface yellowish buff, brightest on the throat, the hairs of the centre of the abdomen and the limbs with greyish bases.

Tail above, distinctly darker than the back, annulated towards the base with black and whitish buff, the tips of the hairs glistening yellow: below, the whitish annulations in excess, the vertebræ clad with short black and grey hairs.

Feet, blackish brown, speckled with yellow buff.

MEASUREMENTS.—Collector's external measurements taken in the flesh: head and body, 173; tail, 165; hind-foot, 42; ear, 16 mm.

Cranial measurements: greatest length, 50.1; basilar length, 43.5; palatilar length, 26.9; palatal breadth, 8.2; zygomatic breadth, 23.8; interorbital breadth, 12.9; cranial breadth, 19.0; breadth of rostrum at diastema, 6.8; length of rostrum at lachrymal notch, 21.3; upper molar series, 15.9 mm.

SPECIMENS EXAMINED.—Twenty, all from the type locality.

REMARKS. This race is more closely associated with the Singapore and Southern Peninsular form than those occurring on the islands and mainland to the north, from which it differs principally in colouration.

CROCIDURA MALAYANA, sp. nov.

TYPE.—Adult female (skin and skull), No. 180111, Selangor Museum. Collected on Maxwell's Hill, near Taiping, Perak, 3,300 feet, on 25th April, 1910, by E Seimund.

CHARACTERS.—Intermediate in size between *Crocidura fuliginosa* and *C. major** and darker than either.

COLOUR. Dark rusty iron-grey throughout, the base of the fur grey. Feet, hands and tail very thinly clad with sooty hairs, the basal half of the latter furnished with a few scattered long white hairs.

SKULL AND TEETH.—Do not differ in characters from those of the above-mentioned races.

MEASUREMENTS.—Collector's external measurements, taken in the flesh: head and body, 80; tail, 57; hind-foot, 13; ear, 11 mm.

Cranial measurements of the type:† greatest length (excluding incisors), 21.8; basal length, 19.5; palatal length, 9.9; lachrymal breadth of rostrum, 4.4; greatest ante-orbital breadth, 7.3; greatest cranial breadth, 10.0; entire maxillary tooth-row (including incisors), 10.1; entire mandibular tooth-row (including incisors), 9.3 mm.

SPECIMENS EXAMINED.—Five, including two from the type locality.

* *Ante*, p. 177.

† For measurements of another adult female see *ante*, p. 195.

REMARKS.—Both size and colour differentiate this animal from the other Peninsular races; in dimensions it closely approaches *U. weberi*, Jentink, * from Western Sumatra, of which it may eventually prove to be the Malayan representative.

RATUFA AFFINIS JOHORENSIS, *subsp. nov.*

Ratufa affinis typica, Bonhote (nec *Slater*), "Ann. Mag. Nat. Hist." (7), v. p. 495 (1900).

Ratufa affinis johorensis, "Trouessart. Cat. Mamm.," p. 308, No. 3,018a (1904) (*nomen nudum*).

Ratufa affinis (sub. lege), "Miller. Proc. Acad. Sci. Washington," ii. p. 77 (1900).

TYPE.—Adult female (skin and skull), No. 1090/11, Selangor Museum. Collected at Padang Tuan, Segamat, N. W. Johore, 25th February, 1911, by Museum Collector.

CHARACTERS.—Intermediate between *Ratufa affinis affinis* (Raffles.), from Singapore Island, and *Ratufa affinis aureiventer* (Geoffr.), from the territory of Malacca. From the former it differs in having the hands the feet concolorous with the rest of the limbs and in the reduction of the dark area on the cheeks and ears and from the latter in having the belly pure white, sharply differentiated from the sides.

COLOUR. Bleached pelage. Above pale cream, head darker and more buffy, the hairs without any visible annulations. Muzzle, a patch beneath and in front of the ears, whitish. A narrow ring round the eye seal-brown. Ears pale seal-brown on their outer aspect, more or less ochraceous on the inner side. Limbs from the shoulders and thighs ochraceous-buff, hardly paler on the hands and feet. A stripe of paler ochraceous-buff from the shoulder to the thigh, interrupted by a not very conspicuous white patch on the outer aspect of the thigh. Tail whitish-brown above, beneath with the proximal half of the hairs whitish, the tips mingled brownish and buffy. Midrib whitish-brown, beneath pure white quite sharply defined from the sides.

MEASUREMENTS. —Collector's external measurements taken in the flesh: head and body, 300; tail, 405; hind-foot (without claws) 70; ear 25 mm. Skull: greatest length,—; basilar length,—; zygomatic breadth, 41.5; greatest length of nasals, 21.8; diastema, 14.9; cranial breadth, 31.1; interorbital breadth, 26.3; upper molar series, 18.3 mm.

REMARKS.—Mr. Miller has already (*loc cit. supra*) remarked that the Johore pale *Ratufa* would probably prove distinct from that of Singapore, while Prof. Trouessart has applied a name, without description, which we have adopted. Besides the type we have seen other specimens from the Sembrong River further south in Johore, but these were in bad condition and without skulls or measurements.

* In Weber's "Zool. Ergebn. Reis. Niederland Ost-Indie," I, p. 124 (1890).

RATUFA MELANOPEPLA PENANGENSIS, *subsp. nov.*

TYPE.—Adult male (skin and skull), No. 1348/11, Selangor Museum. Collected at Telok Bahang, Penang Island, by E. Seimund, on 11th March, 1911.

CHARACTERS.—Similar to *R. m. fretensis*,* Thos. and Wrought, in colour but smaller in size, greatest length of skull never exceeding 70 mm. Size about equal to *R. m. tiomanensis*,† Miller, but abdomen much brighter.

COLOUR.—Upper-surface, and entire tail with the exception of a narrow ochraceous streak at the base of under-surface, black; below, rich tawny ochraceous, this colour extending on the outer side of the neck to the ears and over the front of the fore-limb. No trace of a pale nuchal spot. A small tawny ochraceous patch on the inner side of the hind-foot.

MEASUREMENTS.—Collector's external measurements taken in the flesh: head and body, 322; tail, 372; hind-foot, 76; ear, 30 mm.

Cranial measurements: greatest length, 68.3; condylo-basilar length, 57.1; palatilar length, 25.3; diastema, 14.0; upper molar series, 14.2; interorbital breadth, 27.2; zygomatic breadth, 42.2; greatest length of nasals, 22.2 mm.

SPECIMENS EXAMINED.—Twenty, all from the type locality.

REMARKS.—The patch on the hind-foot is very variable, sometimes taking the form of a slight grizzling only, but it is present in almost every specimen examined.

MUS MÜELLERI FEDERIS, *subsp. nov.*

TYPE.—Adult female (skin and skull), No. 1853/11, Selangor Museum. Collected at Ulu Temengoh, Upper Perak, Federated Malay States, by H. C. Robinson and C. B. Kloss on the 12th July, 1909. Original No. 2917.

CHARACTERS.—A member of the *Muelleri* group agreeing with *Mus validus*, Miller, in its large teeth, shape of the parietals and in the posterior terminations of the nasals but differing in smaller size; with relatively larger feet and slightly more inflated bullæ. From *Mus bullatus*,‡ Lyons, it is at once separated by its very much smaller bullæ, very large teeth, and pentagonal parietals.

COLOUR.—Above grizzled brown and buff, becoming greyer on the sides and darker on the rump owing to the presence of numerous long black bristles. Lower-surface buffy white, the hairs with faint grey bases. Hands and feet very thinly clad, the former brownish the latter white with dark centres. Tail blackish brown throughout.

* "Annals and Magazine of Natural History," ser. 8, vol. iv, p. 535 (1909).

† "Proceedings of the Washington Academy of Sciences," vol. ii, p. 216 (1900).

‡ Lyon, "Proc. U. S. Nat. Mus." xxxiv, p. 646 (1906), 14th September, 1909. *Mus villosus*, Kloss. "Journ., Federated Malay States Museums," 11, p. 146 (1st October, 1909).

SKULL AND TEETH.—Skull fairly lightly built not heavily ridged. Nasals narrowing to a point posteriorly and extending beyond the premaxillary suture. Bullae somewhat dilated, more so than in *M. validus*, but not approaching those of *M. annandali* and *M. bullatus* or those of the *rattus* group. Teeth large, larger than those of the much larger animal, *Mus validus*.

MEASUREMENTS.—Collector's external measurements taken in the flesh: head and body, 182 (236);* tail, 239 (280); hind-foot, 45 (45.5); ear, 21 (23) mm.

Cranial measurements: greatest length, 48 (53.7); basilar length, 37.9 (44.7); palatilar length, 22.5 (24.4); breadth between anterior molars, 4.0 (4.8); length of palatal foramina, 8.1 (8.8); diastema, 12.2 (14.2); length of upper molar row, 10.0 (9.6); median length of nasals, 18.6 (22.7); greatest breadth of combined nasals, 5.6 (5.9); interorbital breadth, 7.0 (8.2); cranial breadth, 18.5 (20.0); zygomatic breadth, 22.5 (26.9).

SPECIMENS EXAMINED.—Two, the type and a sub-adult female from Ginting Bidei, Selangor (Selangor Museum, No. 1798/09).

REMARKS.—This rat is evidently the peninsular representative of the Sumatran *Mus muelleri*, Jentink, the type of which is stated by Miller† to be an immature animal lacking the posterior portion of the skull so that no actual comparison is possible. The dimensions given being those of a mounted specimen can also only be regarded as very approximate.

ON A HORNED OWL, NEW TO THE MALAY PENINSULA.

By HERBERT C. ROBINSON, C.M.Z.S., M.B.O.U.

BUBO COROMANDUS. KLOSSII, *subsp. nov.*

A LOCAL race of *Bubo coromandus* from Peninsular India but very much darker than the typical form.

ADULT MALE.—Above dull brown, head, ear-coverts and mantle slightly darker; the nape and outer webs of the secondaries vermiculated with whitish brown, the former with dark shaft stripes. The under-surface throughout vermiculated with dark brown and whitish-brown and with broad blackish-brown shaft stripes. Feathers of the thighs, under wing-coverts and under tail-coverts similar but more buff. Iris yellow, bill greenish-horn with black base, feet leaden. Total length, 21.5; wing, 15.7; tail, 8.7; tarsus, 2.55; bill from gape, 1.55 inch.

TYPE.—Adult male, Gunong Semanggol, North Perak, Malay Peninsula, collected on 22nd May, 1910, by E. Seimund.

* Measurements in parentheses those of an adult female, *Mus validus* (Selangor Museum, No. 1854/11) from Maxwell's Hill, Taiping, Perak.

† "Proc. U. S. Nat. Mus." xxxiv, p. 647 (1909).

Another specimen from Malacca secured by Dr. Maingay is in the Tweeddale collection in the British Museum, while two mounted specimens from unspecified localities in the Raffles Museum, Singapore, are probably referable to this form.

REMARKS.—According to Blanford ["Faun. Brit. Ind. Birds," iii, p. 287 (1895)], *Bubo coromandus* has not been recorded from further south than Aracan so that the present occurrence is a very considerable extension in range. I have been unable to examine adult Chinese specimens which may possibly prove identical with this and not the Indian race.

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NOTES ON THE NON-MALAYAN RACES OF THE MALAY PENINSULA.

IT is proposed, from time to time as materials accumulate, to publish in this journal brief accounts of the various non-Mahomedan tribes of the Malay Peninsula, derived in all cases from actual and recent observations. The status of many of the communities has changed, and is changing, so rapidly that it seems desirable to place on record with as little delay as may be such information as has been obtained, even though the facts are not novel or apparently trivial, reserving to some future period any general correlation of results or discussion of the facts already recorded or recently elicited.

For the convenience of persons more specially interested a bibliography is given with each series of notes, the papers marked with an asterisk referring entirely to the district under discussion, while those not so marked are of a more general character.

H. C. ROBINSON.

I.—NOTES ON THE BESISI OF TAMBOH, KUALA LANGAT, SELANGOR

BY I. H. N. EVANS, B.A., ASSISTANT, F.M.S. MUSEUMS.¹

(PLATES I AND II.)

[SKEAT AND BLAGDEN.

“The Pagan Tribes of the Malay Peninsula.” Two Volumes.
London, 1905.

MARTIN, RUDOLF.—

“Die Inlandstämme der Malayischen Halbinsel.” Jena, 1905.

WILKINSON, R. J.

“Papers on Malay Subjects.” Supplement: “The Aboriginal Tribes.” Kuala Lumpur, 1910.

* BELLAMY, G.—

“The Sakais of Selangor, Kuala Langat.” *Selangor Journal*, iii, pp. 224-230. Kuala Lumpur, 1895. (Reprinted from a Government Report, dated 1886.)

* SKEAT, W. W.—

“Vocabulary of the Besis dialect.” *Journ. Straits Branch Royal Asiatic Society*, No. 29, p. 13, *et. seq.* (1896). Singapore.

SKEAT, W. W.—

“Sakai Tribes in Selangor, Kuala Langat District.” *Selangor Journal*, v, pp. 325-333, 361-366, 392-395. Kuala Lumpur, 1896.]

¹ A few paragraphs in square brackets [] have been added by me.—
H. C. ROBINSON.

The following notes were made in the months of May and June, 1912, during a ten days' stay among the Besisi of Tamboh, in the Kuala Langat District of Selangor, situated on the coast, about half-way between Batu and Sepang.

The Besisi though still clinging to a certain degree to their old roving habits have been greatly affected by the advance of civilization, many of them now even being able to ride bicycles, which they borrow from the Chinamen. In clothing, with some slight modifications, they follow Malay fashions and bark cloth is no longer made.¹ The use of the blowpipe also appears to be rapidly dying out, partly, the Besisi told me, owing to much ground having been cleared in the neighbourhood, which makes it difficult for them to find an Ipoh tree (*Antiaris toxicaria*) from which to obtain poison for their darts.

1. NAME OF TRIBE.

The Kuala Langat aborigines will not acknowledge the name *besisi* as a tribal designation but call themselves *sehabat* or *sabat*. What they say is this: "The hill people whom we call *orang bukit* call our speech *sisi*. We call the hill people *orang bukit* but their language *blandas*. The name of our people is *orang sabat*, that of our language *sisi*."

[The term "Besisi" has become so standardised as connoting a perfectly definite section of the aboriginal population that the substitution of a new name, even if technically correct, would only cause confusion in the literature. In this series of papers, therefore, *Besisi* will continue to be used.]

2. PHYSICAL CHARACTERS.

HAIR.—The hair is generally cut quite close to the head, though some of the men prefer to let it grow to two or two and a half inches in length. A few of the boys wear it in the manner of Malay children who have not yet been circumcised, others again have it cut short, and in one case I observed that a youth's head had been shorn so as to leave a rather long curly fringe about two inches broad in front, while the hinder parts of the head were covered with only short hair. This boy's hair besides being curly showed a distinct reddish tinge. A tendency to ulotrichy was observed in several individuals, but though in the case of the boy above mentioned the ringlets were fairly tightly wound, they could not be compared with the peppercorn structure which I have seen in photographs of typical Semang.

SKIN COLOUR.—The average skin colour is No. 29 of Broca's chart for the body, and between 28 and 29 for the face, the skin colour of

¹ The Besisi of Morib, Batu, and the vicinity both made and used bark cloth as late as the middle of 1908.—H. C. R.



GROUP OF BESISI LAMPOH KUATA LANGAT, SUTANGOR

the young being usually lighter than that of adults. In many cases it was noted that the skin of the body was as dark or sometimes darker than that of the face; this may possibly be due to the Besisi being a people who are not very cleanly in their persons and partly also to their being largely occupied in fishing, during which employment, no doubt, the majority of their clothes are discarded.

FACIAL APPEARANCE.—The cheek-bones are, as a rule, fairly prominent. In a few men the angle of the lower jaw was very much developed, which gave the face a very square appearance. The forehead was generally low and somewhat rounded. The eyes in some cases were set at a considerable angle from the horizontal and the Mongolian Fold was developed to a very slight extent in a few individuals.

MEASUREMENTS.—The length and breadth of the head were taken in twenty-five adult males.

The greatest length was 188 mm. and the least 168 mm., the mean being 176.9 mm.

The greatest breadth was 148 mm. and the least 136 mm., the mean being 142.0 mm.

The average cephalic index was 80.2, ranging from 84.6 to 73.1.

The Besisi are, therefore, just on the lower limit of brachycephaly and have a cephalic index about four points below the Peninsular Malay who averages about 84.

No.	Head Length.		Head Breadth.		Cephalic Index.	
		Mm.		Mm.		
1	...	181	...	147	...	81.2
2	...	174	...	140	...	80.4
3	...	180	...	143	...	79.4
4	...	169	...	143	...	84.6
5	...	176	...	147	...	83.5
6	...	175	...	142	...	81.1
7	...	178	...	144	...	80.8
8	...	177	...	141	...	79.6
9	...	188	...	148	...	78.7
10	...	173	...	141	...	81.5
11	...	174	...	141	...	81.0
12	...	176	...	147	...	83.5
13	...	175	...	142	...	81.1
14	...	173	...	137	...	79.1
15	...	177	...	147	...	83.0
16	...	176	...	146	...	82.9
17	...	176	...	139	...	78.9
18	...	177	...	139	...	78.5
19	...	170	...	136	...	80.0

No.		Head Length.		Head Breadth.		Cephalic Index.
		Mm.		Mm.		
20	...	183	...	144	...	78.6
21	...	180	...	140	...	77.7
22	...	182	...	141	...	77.4
23	...	186	...	136	...	73.1
24	...	179	...	140	...	78.2
25	...	168	...	138	...	82.1
Mean	...	176.9	...	142	...	80.2

3. MODE OF LIFE.

The main crop planted is rice, swamp rice, *padi paya*, and hill rice, *padi bukit*. The ordinary wet rice, *padi sawah*, which necessitates irrigation, is not grown. Fishing and trapping are also Besisi occupations and some of the traps are very ingenious. At the present time a large number of men are working as jungle-fellers on a neighbouring estate, but they are largely in the hands of the local Chinese shop-keepers to whom they are always in debt and whom the local planters find it necessary to employ as intermediaries when engaging labour. The Chipaman gets a commission on the transaction and ensures the repayment of the advances which he makes in money and kind to the Besisi.

4. HOUSES.

The Besisi house is generally a wretched and very dirty one-roomed bamboo-walled hut, raised on piles, containing only a few cooking pots, mats, fish traps and possibly a spear or blowpipe. The Batin's house was the cleanest and best built of any that I visited; it was roofed with palm leaves, and besides the usual rough household furnishings contained some fine mats and a couple of handsome blowpipes.

The Besisi seems to shift house pretty frequently as the soil of his clearing soon becomes exhausted and he prefers to build again in the fresh *ladang* rather than walk to it from his old hut. This custom, of course, militates greatly against any development of the art of house-building.

The fireplace is of earth, banked in by pieces of wood, and is placed near a wall in the only room. As in Malay houses there is generally a shelf above it on which cooking pots and firewood are stored.

5. MANUFACTURES.

A list of the collections obtained from the Besisi is given below.

Many articles in everyday use are, of course, obtained from the Malays and Chinese, among these being cloth, jewellery, pots and pans, spears, etc. Some things, such as drums (*rebana* and *gendang*) and kites, though probably of Malay origin, are at the present time



L. H. N. Evans. Photo

BESISI BOYS, TAMBOH, SELANGOR.

made by the Besisi themselves, who also produce excellent *pandan* and *mengkuang* mats and baskets, snares of *rotan*, and blowpipes. The musical instruments observed, besides those mentioned above, were two forms of flute, a bamboo "harp" with strings of *rotan* (the instrument known to Malays as *gendang batac*) and bamboo stampers. They told me that the fruit season is the great time for giving musical parties.

The Besisi prahu follows the Malay pattern.

COLLECTIONS MADE AMONG THE BESISI (ORANG SABAT), TAMBOH, KUALA LANGAT, SELANGOR, MAY-JUNE, 1912.

BASKET WORK, TRAPS AND ROPE.—

- (1) Rice sack (*karong bras*) made of *pandan* with dyed red pattern. Height, 517 mm.; diameter, 231 mm.
- (2) Small mat of fine work, ornamented with violet dye, in two layers, face of *pandan*, back of *mengkuang*. Upper layer the finest work. Edges bound with red cloth. 660 mm. by 345 mm.
- (3) Round open pinang basket of *pandan*, white with plaited ornaments. Diameter, 135 mm.
- (4) Small covered tobacco basket (*bujam*) made of white *pandan*, corners peaked at top and bottom. 120 mm. by 60 mm.
- (5) Small *pinang* pouch (*upau*) made in two pieces; of *pandan*, decorated with violet dye. 55 mm. by 53 mm.
- (6) Small circular, closed *gambir* basket of *pandan* with raised points on base and lid (*tumboh*). Diameter, 50 mm.
- (7) Small betel wallet of *pandan* with plaited ornament, edges bound with European cloth, fold-over flap with cord, and double cord for attaching to body. Inner lining (loose) of coarsely plaited *mengkuang*. 125 mm. by 90 mm.
- (8) Small winnowing tray (*nyiru*) pear-shaped in outline, made of *bemban* (the stems of *Clinogyne* sp.). Length, 420 mm.
- (9) Soft carrying basket (Besisi, *sentorkⁿ* klet) made of *mengkuang* with cord of *tërap* bark for attaching to body.
- (10) Water bailer (Besisi, *timba mōk*) made of the flower spathe of a palm, apparently *nibong*.
- (11) Carrying basket (*ambong*) of *rotan* with cord of *tërap* bark. Height, 356 mm.; diameter, 230 mm.
- (12) Fish trap (*bubu*) with two compartments and piece of wood at hinder end which slips out to enable the catch to be extracted. Made of *bemban*. Length, 560 mm.; diameter, 243 mm.
- (13) Cord of twisted bark *antui* (Besisi) *kayu gëharu* (Malay). [*Antui* is a Malay word applied, *vide* Ridley (*Journ. Straits Branch Royal Asiatic Society*, No. 30, p. 39, 1897),

to *Drepananthus*, a genus of Anonaceous trees, tall and straight but never of any large size. *Gēharu* is incense or eagle wood, *Aquilaria malaccensis*, of which there are several forms, frequently called *chandan* by Malays. In the Tembeling the bark of young specimens of the latter species is also used as cordage.]

(14) Pelandok trap (*Jerat leher*) *see postea*, p. 7.

(15) Pelandok trap (*Jerat jong*, *jong*=*kaki*) *see postea*, p. 7.

(16) Bird lime apparatus—

The holder is called *tomak* and the limed sticks *gleyer*.

[The gettah employed as lime is obtained from the *kayu ara* (a generic name for species of *Ficus*), the gettah itself being called *gettah bagu*.

Malays and many Sakais use for this purpose the gettah from wild or cultivated species of chempedak and jack fruit (*Artocarpus* spp.). *Bagu*, according to Wilkinson, is a plant name doubtfully referable to *Gnetum gnemon*.]

MUSICAL INSTRUMENTS.—

(17) Long flute with three stops made of bamboo (*ding byu*). Length, 594 mm.

(18) Small flute with three stops and some attempt at ornamentation (*Besisi*, *Tebon*). Length, 357 mm.

The *Besisi* state that they do not use nose flutes.

(19) Two bamboo stampers (*Besisi*, *ding tengkeng*). Lengths 253 and 213 mm.; diameter, 43 and 39 mm.

(20) Bamboo harp with three rotan strings (*Besisi*, *Ding banyeng*). Length, 410 mm.; diameter, 38 mm.

FIRE-MAKING APPARATUS.—

(21) Several sets of saw-method apparatus (*Besisi*, *gesek sama chong*, *chong*=cord), saw of *rotan*, wood *kayu mahang* (*Macaranga* spp. soft wood trees with large leaves). *c.f. postea* p. 8.

(22) Several sets of drill-method apparatus (*Besisi*, *gesek sama te*=hands) drill and block of *mahang*. *c.f. postea* p. 9.

BLOWPIPES AND APPARATUS.—

(23) Blowpipe (*Besisi*, *blau*). Mouthpiece, conical. Outer case decorated towards mouthpiece and also near distal end. Intervening portion smooth. Distal end covered with gettah (*ambalau*). Inner tube in two pieces. Length, 1,772 mm.

(24) Leaves for polishing blowpipe darts (*Besisi*, *chinrat domok*). [Skeat (*op. cit.* i, p. 311) gives this word as *chengat*. The leaves are the same as those known to the Malays as *dauw mempelas* (*Dehnia sarmentosa*) which are used in place of sand-paper for polishing by Malay craftsmen.]

- (25) Materials for making blowpipe darts, together with one completed dart.
- (26) Quiver (Besisi, *link*) with somewhat conical cap. Inside lined with reeds lashed to quiver to contain separate darts. Cap filled with down (*rabok*) from the base of the leaf stalks of a palm.

MISCELLANEOUS.--

- (27) Various decorations made by the Besisi for use at a Malay marriage—viz.:

Bunga pinang ;
Kris ;
Kumber (a palm, *Zalacca wallichiana*, Mart.) ;
Bunga serai (lemon-grass) ;
Subang (ear-studs) ;
Buah jerei (? *jering*) (*Pithecolobium* spp.).

{ These ornaments, which are made out of plaited palm leaves, are very characteristic of many of the Selangor aboriginal tribes. Dr. Annandale and myself met with similar objects among the "orang bukit" of the Kuala Lumpur district in 1902 (c.f. *Fasciculi Malayenses. Anthropology*, i., p. 51, 1903).]

G. TRAPS.

PELANDOK TRAP (*Jerat Leher*).

The *jerat leher* is a slip noose trap which is set in a pelandok (mouse-deer) track. The noose is arranged so that the *pelandok* shall get its head into it and in its struggles to become free pull the loop of the cord from under a peg, which holds down a bent bamboo. When the tension on the bamboo is thus released it springs back to its original position and in doing so it tightens the cord round the pelandok's neck, effectually hanging it.

PELANDOK TRAP (*Jerat jong*).

This is a noose trap for the feet which is set with a springe and trigger. A young and flexible bamboo is first fixed upright in the ground and to the top of it a rotan cord nineteen or twenty inches long is attached, at the end of which is a small peg, blunt at one end but sharpened at the other. The rotan cord, which is otherwise single, is strengthened by its end being twisted round the peg and then for about an inch upwards. At the upper end of this twisted portion of the rotan a cord of *tërap* bark is attached which ends in a ring. Before setting the trap this ring is threaded back over the cord so that a running noose is formed. When the bamboo springe has been fixed in position and the noose made, a piece of bamboo about sixteen inches long is taken and bent to form a flat-topped arch. This, when its ends have been sharpened, is fixed firmly in the ground. The cord with the peg is led under the arch, that with the noose above it. The peg is placed so as to rest with its blunt end against the top bar

of the arch. A U-shaped framework of rotan, with transverse lashings of the same material, is then placed partly under the arch, and the portion of the U where the limbs join is raised from the ground until it is supported by the sharpened end of the peg. When this has been done the noose is arranged over the rotan framework and the trap is thus set. Any animal putting its foot into the noose and treading on the framework underlying it causes the latter to fall. This releases the small peg or trigger from under the arch and the tension on the rotan cord being thus relaxed the bamboo springs back to a more perpendicular position, at the same time tightening the noose around the animal's leg.

[Both these traps are almost universally in use from Nepal and Assam, eastwards throughout Indo-China and the Malay Peninsula and all over the Greater Sunda Islands and are used by all the races inhabiting this area indifferently. A good figure of the second form described above is given by Ling Roth (*The Natives of Sarawak and British North Borneo*, i., pp. 430, 431, figs. 1896).]

7. PATTERNS ON BLOWPIPES.

Whatever the patterns on the Besisi blowpipe may have been in former times, they are at the present very degenerate, consisting as a rule of meaningless roughly engraved circles running round the stem. The spaces between these are sometimes filled up with rude slanting lines running from circle to circle. On one blowpipe there were a few drawings which I was told represented spiders (Bes. *jamang*). The men said that the circle and the marks between them had no meaning but were simply decorations.

8. FIRE MAKING.

Besides the universal Swedish or Japanese match and the flint and steel, two methods of fire-making are known to the Besisi, which, however, are now only survivals—the rotan saw and the drill—the former being called *gesek sama chong*, Malay, *gesek sama tali*, the latter *gesek sama tee*, Malay, *gesek sama tangan*.

In the first method a piece of soft dry wood (*muhang*) twelve or eighteen inches in length is obtained. In this an oval boat-shaped hole is made which is about three inches in length and reaches right through the wood, having only a small opening on the lower surface.

In producing fire, a strip of rotan about two feet long, to the ends of which two cross pieces of wood are tied to serve as handles, is passed under the piece of soft wood which rests on the ground with the smaller orifice of the hole directed downwards. When the rotan has been adjusted so that it covers the smaller hole (a groove is often cut to receive it) the ends of the piece of wood are held down, each by one of the fire-maker's feet. The handles of the rotan cord are then grasped in the hands and the rotan is slowly sawed backwards and forwards over the hole in the under surface of the wood. The pace of the motion is gradually increased until the rotan has eaten

deeply into the wood, and the dust produced by the friction begins to be forced up into the cavity in the block of wood. After a time this dust ignites owing to the heat produced by the constant friction, and the smouldering tinder is then turned out and fanned to a blaze. As soon as fire has been produced the rotan becomes charred in the middle and snaps into two halves.

In the second method two pieces of the same soft wood are used, one of these, about a foot long with a diameter of half an inch, being carefully rounded to form a drill, while the other, which may be a foot or more long, has a vertical V-shaped groove cut into it on one side, the point of the V being directed inwards. The piece of wood with the groove in it is held down with the feet and the drill is then placed at right angles to the block with its point at the innermost edge of the cut, where a small cup-shaped depression has been made to prevent it slipping out and to give it a purchase. The top of the drill is then taken between the palms of the hands and rubbed downwards slowly with a backwards and forwards motion. It is then re-grasped in a similar manner as quickly as possible and the action repeated again and again. The rapidity of the motion is gradually increased until a deep hole is formed and the dust from this falling into the V-shaped cut becomes ignited.

To a European the sawing method is much the easiest of the two as in the drill method the friction hurts the hands and also it is impossible for a novice to re-grasp the drill at the top quickly enough when repeating the motion.

9. TIME.

The Batin of the Besisi told me that his people have no method of measuring time other than by nights and days. He said that they did not know how to count months although they knew that the moon waxed and waned, nor did they reckon time by the *taun padi*.¹ With regard to finding the correct season for rice-planting, when they thought that the time was approaching they asked the Malays when the fasting month (*bulan puasa*) began. If they were told that it was already the *bulan puasa* they considered that it was time to plant if the weather was favourable; if not, they waited for a change.

10. CEREMONIES.

Taking the *Semangat Padi* (Rice Soul).

The following account was given to me by the Batin:

At the end of the harvest season the *pawang*² asks the people if they have all finished reaping and if they answer "Yes," he says "I will take the *semangat padi* early this morning." A patch of *padi* about as large as could be enclosed by the two hands, if the two index fingers and the two thumbs were placed together, has previously been left in the clearing. The *pawang*, taking a small knife (*pisan wali*), reaps this patch. He puts his reapings into a small

¹ Rice year. ² Shaman or magician.

bag and hangs it up in his house. Then he burns incense (kemennyan) under it. Nobody but the *pawang* may touch the *semangat*. When the new planting season begins the *pawang* takes the *semangat* seed and scatters it in the clearing before anyone else has sown. On the next day or the day following the general *padi* sowing begins. The *semangat* ceremony is used for *padi paya* but not for *padi bukit*.

[The last statement is interesting as the planting of *padi paya* is probably of comparatively recent date among the Besisi while *padi bukit* has probably always been grown. The *semangat* ceremonies have, therefore, almost certainly been adopted from the Malays and cannot be considered as indigenous.]

MARRIAGE.—The following are a few disconnected statements concerning marriage customs which I obtained, chiefly from the *Bomor* of the Besisi.

It is an unknown thing for a man to have more than two wives, though several have as many as two.

A man may select a wife from wherever he pleases. There are no rules regarding the locality from whence she has to be taken.

If both a man and his wife wish for divorce they give cloth to one another.

Both parties must be willing before a divorce can take place. The divorce is proclaimed by the *Batin*.

A man who wishes to take a wife does not have to pay either money or goods to his wife or her relations. (That is to say, there is no wife buying.)

A man gives the girl he is to marry money to buy food for the wedding feast and clothes for the marriage.

Formerly the woman on the marriage day waited at the house of her mother. The man was carried from his house to that of the woman and he might not leave it for one or two days. If the wife was not a virgin connection might take place on the first night; otherwise it was considered right to refrain for some days.

Sometimes the man stops on at the house of his wife's parents, sometimes he makes a house for himself after three or four months.

TOOTH-FILING.—Both men and women file the six front teeth of the upper jaw. This was formerly done with a stone but now the European file is in use. The operation may be performed by any friend or relation. The *bomor* told me that the tooth-filing might be done when people were "*chukup besar*." As far as I could make out it takes place at any time after the age of puberty, but always before marriage.

Tooth-blackening used to be in fashion but is now obsolete.

TATTOOING.—I observed tattooing on the arms of one or two men and women but in every case was informed that it was the work of Chinamen.

11. PANTANGS.

The following Pantangs were collected at Tamboh, chiefly from the Batin.

SICKNESS PANTANG.—No stranger or person from another house may go to a house where a man is lying sick.

The reason for this would appear obvious. A man not belonging to the house might bring with him evil influences or spirits which would attack the sick man and prevent his recovery.

PADI PANTANGS.—

1. *Pantang Tikus*—When padi is being planted no one must fold his coat back over his head. If the *pantang* is broken rats will eat the crop.
2. *Pantang Babi and Pantang Rusa*—When the padi has been planted a man who is going into the jungle must both leave and return to the clearing by the same path; otherwise the deer and pig will enter the crop by one path and after going through the whole and damaging it will leave by another road.

A man who breaks this *pantang* is therefore symbolically bringing the pigs right through the crops. Probably, also, there is an element of common sense underlying the superstition for if there are many paths leading to a clearing game will become accustomed to using them and so to frequenting the clearing itself.

3. *Pantangs with regard to new clearings*—When a new clearing is being made the coat must not be turned back over the head.

A parang must not be left sticking into the top of a stump. If it is animals will come and eat the crop or it will not grow properly.

After the people have worked for the first three days on a new clearing they must stop work for a day. This is to propitiate the *hantu sheitan*.

FISHING PANTANGS.—The crocodile must not be mentioned by his real name at sea but must be called *pawang laut*.¹

Fish must not be cut up on a half-burnt log (*i.e.*, one which the fire has eaten) or crocodiles will get into the *blat*² and eat the fish.

PANTANGS FOR WOMEN AFTER CHILDBIRTH.—A woman who has given birth may not eat salt, pepper, fish or the flesh of wild animals for three days after delivery.

I was informed that there are no pantangs for a man whose wife is with child.

¹ The wizard of the sea.

² A kind of large stake trap for fish.

12. RELIGION.

The Orang Besisi of Tamboh appear to be almost without any religious beliefs. Possibly they have some and would not tell me about them, but the Batin denied that they had anything of the kind. All he would admit was that they *had* heard of the "Pulau Buah," where, according to Skeat, the soul of the Besisi dead are supposed to go. From his conversation, however, I gathered that he did not seem to think much of the idea of going to such a place, if in fact, he did not altogether disbelieve in it.

GHOSTS.—Ghosts, however, appear to be firmly believed in and the following names of *hantu* were mentioned to me, though I could not find out in some cases from whence they were derived or what was their occupation.

Hantu kayu (a wood spirit);

Jin Kafir;

Hantu Sheitan meri;

Hantu Limbas;

Hantu Kanbing (which comes to eat the blood when a birth takes place).

[The last mentioned, which should possibly read *hantu kembang*, is equivalent to, if not actually derived from, the well-known Malay *penanggalan*.]

13. LANGUAGE.

GENERAL REMARKS.—The usual difficulties were experienced in obtaining translations of words expressing some general idea. For instance, it was impossible to obtain any word for "brother" (*sudara*) though those for elder brother and younger brother were at once given in answer to the question: "What do you say for brother"? Again, when the word for "beast" was asked for my informant at once tried to descend from the general to the particular and started giving the names for elephant, tiger, etc., being unable to grasp the full meaning of the question. Much the same sort of difficulty was experienced in obtaining the Besisi for such words as "I," "thou," "he," etc., and "who," "this" and "that."

NUMERALS.—The Besisi only possess words, distinct from Malay, for the numerals: 1. 2. 3 they are as follows:

One	...	<i>mui</i>
Two	..	<i>'mbar</i>
Three	...	<i>impe</i> .

VOCABULARY.—

English.	Malay.	Sisi.	Remarks.
Back	... blakang	{ kelort ⁿ kelorn	{ kelort ⁿ merat = The or Elephant's kelorn. back.
Beast	... binatang	... ?	
Big	... besar	{ kadum kadōi	... u sound
Blood	... darah	... māhām	

English.	Malay.	Sisi.	Remarks.
Boat	... prahu	... pāhū	
Body	... badan	... krēt	
Bone	... tulang	... jā-ārng	
Breath	... napas	... nōi	
Brother	... Sudara laki	... ?	
Child	... anak	... kēnōn	
Cloud	... awan	... awan	
Day	... hari	... hari	
Ear	... telinga	... turgg ⁿ	... u sound not oo
Earth	... tanah	... tēh	
Eye	... Mata	... mēt	
Father	... bapa	... wērth	
Fire	... api	... us	... oo sound
Fish	... ikan	... ka	
Food	... makanan	... ?	
Foot	... kaki	... jong ⁿ	
Forest	... utan	... miree	
Ghost	... hantu	... hantu	
Hair	... rambut	... sūk (oo)	
Hard	... kras	... jēheg ⁿ	
He	... dia	... hnki	
Head	... kepala	... hoie	
Heart	... jantung	... tongul	
Hill	... bukit	... chork ⁿ	
House	... rumah	... dūkn	... oo sound
I	... sahya	... ūtn	... oo sound
Lightening	... kilat	... kilat	
Liver	... hati	... gris	... (pronounced to sound like English "grace")
Man	... laki	... lemol	
Moon	... bulan	... bulan	
Mother	... ma	... gādēh	
Mountain	... gunung	... chork ⁿ	
Neck	... leher	... lēhē	... last syllable pronounced "Hay"
Night	... malam	... doī	
No	... tida	... ngot	
Nose	... hidong	... mūh	
(Is) not	... tid'ada	... hāmp	
Quick	... lekas	... yūt jūs	... both with u sound
Rain	... hujan	... gēmar	
River	... sungei	... dōh gēni	
Sea	... laut	... bow ow	
Shoulder	... bahu	... bā-hū	
Sister	... sudara perampuan		

English	Malay.	Sisi.	Remarks.
Skin	... kulit	... kulit	
Sky	... langit	... langit	
Small	... kecil	... hédět	
Soft	... lembut	... lēmöt	
Slow	... lambat	... lengar	
Soul	... semangat	... semangat	
Star	... bintang	... bintang	
Stone	... batu	... batu	
Sun	... matahari	... mět hari	
That	... itu	... nākěh	
This	... ini	... nāhōh	
Thunder	... guruh	... guruh	
Tongue	... lidah	... lidah	
Tooth	... gigi	... lemoim	
Tree	... pokok kayu	... lork ^a	
Water	... ayer	... dōh	
We	... kita	... kita	
Who ?	... siapa	... hmak	
Wind	... angin	... bū-ah	... u has oo sound
Woman	... perempuan	... kädū	... u has sound of oo
Yes	... yah	... nah	
You	... engkau	... how	
Come here			
quickly	... mari sini dras	jöhöt jus	
Go there	... pergi sana	... choho keh	
I shall go to the			
coast	... mau pergi laut	Che bowow	
Where are you			
going ?	... pergi mana	... Chōh hädung	

NOTES ON BIRDS NEW TO, OR RARE IN, THE MALAY PENINSULA.

(THIRD SERIES.)

By H. C. ROBINSON, C.M.Z.S., M.B.O.U.

THE present notes continue those published in this journal, vol. IV, pp. 129-133 and pp. 229-233, and relate to species obtained in the ordinary course of collecting during the last eighteen months in the Federated Malay States and the adjacent portions of the Malay Peninsula.

CALOPERDIX OCULEA (TEMN.)

Caloperdix oculus (Temm.); *Ogilvie Grant, Cat. Birds Brit. Mus.*, xxii., p. 222 (1893); *Robinson and Kloss, Ibis*, 1910, p. 671.

This handsome Jungle-Partridge, which is extremely rare in collections, was found to be by no means uncommon in swampy jungle at the foot of precipitous limestone hills near Pelarit in Perlis, a small state in the north of the Peninsula, bordering on Kedah. Our collectors secured numerous specimens and also observed that it was kept in captivity by the local Malays who fed it on termites or white ants. Caged specimens, however, were said not to be long-lived.

A single male was also shot in February, 1912, at the height of 3,000-feet on Menang Gasing, a mountain in the main range of the Peninsula near the junction of the boundaries of the three states, Selangor, Negri Sembilan and Pahang.

As noted elsewhere, the locality "Malacca" for four specimens in the British Museum is open to grave suspicion, the skins having most probably been obtained by Malacca bird-hunters from some district in the north of the Peninsula.

Males differ from the females in the slightly larger size, most noticeable in the bill, and in the presence of a blunt tarsal spur or knob, which is sometimes reduplicated. Less adult specimens have the V-shaped black markings on the flanks encroaching on the centre of the breast.

ARBORICOLA CHARLTONI (EYTON).

Arboricola charltoni (Eyton); *Ogilvie Grant, Cat. Birds Brit. Mus.*, xxii., p. 221 (1893).

A single female specimen was obtained at Pelarit, Perlis, in November, 1911. Throughout the Malay Peninsula this partridge is a very rare bird though common in the vicinity of Lenggong in Upper Perak, but in the first few months of 1912 it suddenly appeared in considerable numbers on the lower slopes of the Larut Hills, in the vicinity of Taiping, Perak. Large numbers were snared by the Malays and several are now in the gardens of the Zoological Society, London.

The locality "Penang" attributed to six specimens in the British Museum is certainly erroneous, the birds having probably been brought over alive to Dr Cantor from Kedah or Perlis.

LOPHURA RUF A (RAFFLES).

Lophura rufa (Raffles); *Ogilvie Grant, Cat. Birds Brit. Mus.*, xxii., p. 286 (1893).

The Fire-back Pheasant, though not uncommon in certain localities, is not an easy bird to snare or shoot and the local museums are very deficient in specimens. Two males, adult and immature, were secured at Pelarit, Perlis, in November, 1911, by our Dyak collectors.

OSMOTRERON BICINCTA (JERD.).

Osmotreron bicincta (Jerd.); *Salvadori, Cat. Birds Brit. Mus.*, xxi., p. 57 (1893); *Robinson and Kloss, Ibis*, 1910, p. 674.

Out of several hundreds of the common *O. vernans* shot by Mr. Seimund during the 1910-12 seasons, three—two males and a female—shot on 30th November, 1910, and 1st February, 1912, proved to be of this species. Whether it comes south during the winter months or is resident throughout the year in the Malay Peninsula is not yet ascertained but all the specimens hitherto obtained have been shot between November and February.

OSMOTRERON VERNANS (LINN.) VAR.

Osmotreron vernans (Linn.), *Salvadori, Cat. Birds Brit. Mus.*, xxi., p. 60 (1893).

Among a large number of this species shot in Taiping during the last two years are two specimens—a male from Kamunting, obtained on 13th June, 1911, presented by Mr. Gray, and a female from Simpang, dated 1st February, 1912, shot by Mr. Seimund—which show a variation not uncommon among the members of this sub-family (*Treeroninæ*) consisting of a defect of yellow pigment so that those portions of the plumage which are normally yellowish green become greyish green or pearly grey. The opposite variation in which there is an excess of yellow pigment so that the whole bird becomes more or less of a canary yellow colour is also not uncommon and specimens representing this phase have also been obtained near Taiping.

RALLINA FASCIATA (RAFFLES).

Rallina fasciata (Raffles); *Sharpe, Cat. Birds Brit. Mus.*, xxiii., p. 75 (1894).

Rails of these genus are by no means common in the Malay Peninsula though possibly more numerous in the northern districts. During a short stay at the end of October, 1911, at Alor Stah, the capital of Kedah, which is surrounded by large areas of alluvial rice lands, we found that this species was being hawked about the streets in large numbers at a rate equivalent to two for a penny. Slightly further north in Perlis it was also not uncommon in the rice

fields. The other species of the genus *Ballina superciliaris* (Eyton) is very much rarer and is represented by four or five specimens only in the Federated Malay States Museums.

DRAMAS ARDEOLA. PAYKULL.

Dromas ardeola, Paykull; *Sharpe, Cat. Birds Brit. Mus.*, xxiv., p. 28 (1896).

The Crab Plover does not appear to have been recorded from further east than the Andaman Islands or on the eastern shores of the Bay of Bengal. On 24th September, 1912, Mr. Seimund shot three specimens, none of them quite adult, out of a flock of six met with on the mud-flats near Pulau Pintu Gedong, Klang Straits, Selangor.

HYDROCHELIDON LEUCOPTERA (MEISN. & SCHINZ).

Hydrochelidon leucoptera (Meisn. and Schinz); *Saunders, Cat. Birds Brit. Mus.*, xxv., p. 6 (1896).

The whiskered Tern was noted in considerable numbers in breeding plumage in Penang harbour in March, 1911, but specimens were not obtained. A large series of immature birds and birds in winter plumage were secured in the same place in October, 1911. The species seems to be not very common in Malayan waters.

STERNA ANÆSTHETA, Scop.

Sterna anæsthetæ, Scop.; *Saunders, Cat. Birds Brit. Mus.*, xxv., p. 101 (1896); *Oates, Cat. Birds Eggs Brit. Mus.*, i., p. 190 (1901).

Two small rocks about 150 feet high, between the islands of Sri Buat and Tioman, off the coast of Pahang, on the eastern side of the Peninsula, are frequented by myriads of this tern. We visited these rocks, which are known as Tokong Burong, on 15th June, 1912, and secured a considerable number of eggs which were much incubated, though no young birds were seen. The rocks are almost precipitous with flat tops and are covered with a wiry grass growing in isolated tussocks. The eggs are laid singly underneath or by the side of these tussocks and take a good deal of finding.

Of the series of fifteen before me the ground colour varies from greenish white to pinky brown, and there is an equally wide range in the character of the mottling which varies from an almost evenly distributed speckling of dull pinkish brown to bold blotches of rich chocolate brown, either evenly distributed over the shell or congregated at the larger end. In all the specimens there are underlying markings of clouded pinky-buff which, as Oates remarks, are not very conspicuous.

One egg, which was unfortunately smashed in descending the rock, was almost pure white without any markings. There were many thousands of the terns around the rock all in full breeding plumage with the steamers well developed, and intermixed with them were a few *Sterna melanauchen*, of which, however, we did not find the eggs in this locality.

STERNA MELANAUCHEN. TEMM.

Sterna melanauchen, Temm.; *Saunders, Cat. Birds Brit. Mus.*, xxv., p. 126 (1896); *Oates, Cat. Birds Eggs Brit. Mus.*, i., p. 195, pl. xv., fig. 3 (1901).

The Black-naped Tern breeds sparingly on the rocks and cliffs of the islands of Sri Buat, Tioman, Peniunggil and Aor, off the coasts of Pahang and Johore, not, as a rule, at any great height above sea-level. The eggs are always single and are laid in slight depressions of the rock without any attempt at a nest or concealment. Twelve eggs, all obtained on Pulau Aor, vary less among themselves than is the case with those of *St. anæsthesia*, the differences being mainly in the size and tint of the larger olive brown blotches. An average egg measures 41 × 28 mm.

METOPIDIUS INDICUS (LATH.)

Metopidius indicus (Lath.); *Sharpe, Cat. Birds Brit. Mus.*, xxiv., p. 76 (1896); *Blanford, Faun Brit. Ind. Birds*, iv., p. 219 (1898)

Blanford (*loc. cit.*) gives the range of the Bronze-winged Jacana as extending to the Malay Peninsula though I have been unable to find any authority for his statement and had therefore excluded it from my Hand-list of the Birds of the Malay Peninsula.

A single specimen was, however, shot among thick vegetation at the edge of a pond at Asam Kumbang, near Taiping, Perak, by the Chinese Taxidermist of the Perak Museum on 14th December, 1911, and a companion bird was seen. The species must therefore be added to the Peninsular list.

NETTION CRECCA (LINN.)

Nettion crecca (Linn.); *Salvadori, Cat. Birds Brit. Mus.*, xxvii., p. 243 (1895).

A female teal was shot in the vicinity of Kuala Lumpur, Selangor, in April, 1912, by Mr. J. Galloway, to whom the museum is indebted for many rare birds, and presented by him to the Selangor Museum. I had overlooked the occurrence of this bird in the Peninsula but a female collected by Dr. Maingay in the territory of Malacca is in the British Museum collection.

I do not know of any other instance of its occurrence within our limits.

NETTION FORMOSUM (GEORGI).

Nettion formosum (Georgi); *Salvadori, Cat. Birds Brit. Mus.*, xxvii., p. 240 (1895)

My Malay assistant on a visit to his home on the Bruas river in the Dindings territory, north of the mouth of the Perak river, bought from a local Malay two pairs of the Baikal Teal. The original owner stated that he had caught them as ducklings in the river with a casting net (*jala*) but it is probable that they were the offspring of a domesticated pair.

UPUPA INDICA, REICHENB.

Upupa indica, Reichenb; *Salvin, Cat. Birds Brit. Mus.*, xvi., p. 10 (1892).

Mr. Seimund shot a female at Kamunting, near Taiping, Perak, on 5th November, 1911, which is the most southerly record for the species and the only record for the Federated Malay States. In the same month our collectors found it common at Padang Sireh, on the Perlis-Senggora border.

BATRACHOSTOMUS AFFINIS, BLYTH.

Batrachostomus affinis, Blyth; *Hartert, Cat. Birds Brit. Mus.*, xvi., p. 643 (1892).

Though skins of the three local species of Frogmouths appear to have occurred fairly frequently in the old Malacca collections, the more recent collectors do not seem to come across them often, and I have not myself examined more than ten or twelve specimens in the flesh or in recent skins.

Our collectors obtained a single female of this species at Parit, on the Perak river, on 14th September, 1911. It was with the succeeding species shot at dusk on the edge of a patch of swampy jungle.

BATRACHOSTOMUS STELLATUS (GOULD).

Batrachostomus stellatus (Gould); *Hartert, Cat. Birds Brit. Mus.*, xvi., p. 639 (1892).

A single female was shot in the same locality as the preceding on 17th September, 1911.

CHÆTURA INDICA, HUMÉ.

Chætura indica, Hume; *Hartert, Cat. Birds Brit. Mus.*, xvi., p. 475 (1892).

A male of this form was shot by Mr. J. M. Gray at Simpang, near Taiping, Perak, on 17th December, 1911. Another was shot by Mr. C. Burn-Murdoch at Kajang, Selangor, on 26th November, 1912, in mistake for a snipe. The few specimens of this species on record from the Peninsula have all been obtained in the winter months while *Ch. gigantea* is resident throughout the year.

INDICATOR ARCHIPELAGICUS, TEMM.

Indicator archipelagicus, Temm; *Shelley, Cat. Birds Brit. Mus.*, xix., p. 4 (1891); *Robinson and Kloss, Ibis*, 1911, p. 44.

Owing to a very dry season and the consequent profuse flowering of the *nerum* trees (*Dipterocarpus crinitus*) the Tahan river and the lower slopes of the mountain were in July, 1911, invested with incredible multitudes of bees which made life a burden during the daytime. Perhaps as a corollary we secured two specimens of the Malayan Honey Guide, both males, with the yellow shoulder spot well developed. In the previous eight years' collecting we have only obtained two other specimens.

LYNGIPICUS CANICAPILLUS BLYTH.

Lyngipicus canicapillus, Blyth; *Hargitt, Cat. Birds Brit. Mus.*, xviii., p. 322 (1890); *Robinson and Kloss, Ibis*, 1911, p., 46.

Of three birds, two males and a female, collected in November, 1911, at Padang Sireh, on the Perlis-Senggora border; one male has the central rectrices quite unspotted and is rather smaller than the other male from the same locality, the wing measuring 77 mm. against 82 mm. The wing of an adult male from Kuala Lumpur is also 82 mm., and in this specimen also the central rectrices are only very slightly spotted. In view, however, of the fact that both races occur in the same area I do not think that *I. pumilus*, Hargitt, which was founded on these differences, can be recognised as even sub-specifically distinct.

CHALCOCOCCYX MALAYANUS (RAFFLES).

Chalcococcyx malayanus (Raffles); *Shelley, Cat. Birds Brit. Mus.*, xiv., p. 298 (1890).

In the central and northern portions of the Peninsula this cuckoo is a very rare bird. Two males and a female, collected by Mr. Seimund at Lenggong in Upper Perak in January, 1912, appear to be the most northerly specimens on record.

PITTA CÆRULEA (RAFFLES).

Pitta cærulea (Raffles); *Sclater, Cat. Birds Brit. Mus.*, xiv., p. 416 (1888); *Robinson and Kloss, Ibis*, 1911, p. 48.

A half-grown nestling obtained at Pelarit, Perlis, early in November indicate that this species breeds in the later portion of the year.

PITTA COCCINEA, EYTON.

Pitta coccinea, Eyton; *Sclater, Cat. Birds Brit. Mus.*, xiv., p. 431 (1888).

Until recently this very handsome species of (Ground) Thrush was but poorly represented in the Federated Malay States Museums. Recently, however, we have found that it is resident throughout the year in low country swampy jungle, which is very unpleasant to collect in; and series have been obtained from Ayer Kring on the Negri Sembilan-Pahang boundary, at Rawang in Selangor, and at Parit in the lower portion of the Perak river valley.

CYORNIS RUFIGASTRA (RAFFLES).

Muscicapa rufigastrea, Raffles, *Trans. Linn. Soc.*, xiii., p. 312 (1822).

Cyornis frenata, *Hume, Stray Feathers*, viii., p. 114 (1880).

Cyornis erythrogaster, *Sharpe, Hand-List Birds*, iii., p. 216 (1901).

Mr. Seimund collected a series of five specimens of this flycatcher on Pulau Pintu Gedong, Selangor, in September and October, 1912, two males and three females. The latter agree exactly with the description of *C. frenata* of which they are practically topotypes and with another female collected at Tanjong Tombak, Pulau Bintang,

south of Singapore, which was shot in company with a male agreeing in characters with *C. rufigastra*. The two males from Selangor have slightly paler undersurfaces than the latter but the difference is only trivial. There is not the slightest doubt therefore that *C. rufigastra* and *C. frenata* are male and female of the same species and those purists who reject Raffles' name as a *vox hybrida* must adopt *C. frenata* in preference to Sharpe's emendation, *C. erythrogaster*.

This species, again, is strictly confined to the mangrove zone which accounts for its comparative rarity in collections.

CYORNIS ELEGANS (TEMM.).

Siphia elegans (Temm.); Sharpe, *Cat. Birds Brit. Mus.*, iv., p. 441 (1879).

Cyornis elegans, Hartert, *Nov. Zool.* ix., p. 550 (1902) (*Pahang lowlands*).

This handsome flycatcher is extremely rare in the Malay Peninsula and the only specimen we possess is one from Padang Tuan, Segamat, North Johore, obtained by one of our Dyak collectors on 19th February, 1911.

EUPHILOUS EUPHILOUS (J. & S.).

Pinarocichla euphilosa (J. & S.); Gadow, *Cat. Birds Brit. Mus.*, vi., p. 62 (1881); Oates, *Faun. Brit. Ind. Birds*, iii., p. 279 (1889).

The Crested Brown Bulbul is by no means a common bird in the Malay Peninsula and is rarely found in large numbers. The Federated Malay States Museums have specimens from Selama and Parit in Perak, Tanjong Malim, Rawang and Cheras in Selangor, and from the territory of Malacca. The species seems to be mainly an inhabitant of low country jungle and is not found on the hills. The only place where it has been found at all abundantly is Rawang, where numbers were attracted by the fruiting of a species of fig tree in July, 1912.

PYCNOTUS ROBINSONI, GRANT.

Pycnotus robinsoni, Grant: *Kloss, Journ. Fed. Malay States Mus.*, iv., p. 238 (1911).

Three more specimens of this Bulbul were obtained at Padang Sireh, Perlis-Senggora border, in November. They agree well with the specimen mentioned by Mr. Kloss and render it more than doubtful if *P. robinsoni* can be maintained even as a sub-species distinct from *P. blanfordi*.

KENOPIA STRIATA (BLYTH).

Kenopia striata (Blyth); *Kloss, tom. cit.*, p. 232.

Two more specimens, both males, were obtained at Rawang, Selangor, in July. The species has not hitherto been recorded from the State.

CALORNIS CHALYBEA (HORSF.).

Calornis chalybea (Horsf.): *Sharpe, Cat. Birds Brit. Mus.*, xiii., p. 543 (1890).

Specimens from the outlying island of Pulau Aor, in the South China Sea, seem at first sight to be separable by their coarser more robust bills, though the other dimensions do not differ appreciably. In colour the island birds are not distinguishable from those found on the mainland. Salvadori has separated the bird from Nias under the name *C. altirostris*, mainly on account of the larger bill and darker colouration, both characters that seem very frequently developed in island races of widely distributed birds.

CHALCOSTETHA PECTORALIS (TEMN.).

(*Chalcostetha insignis* (Temm.)); *Gadow, Cat. Birds Brit. Mus.*, ix., p. 12 (1884).

The Purple-breasted Sun-bird was but poorly represented in our collection by three skins from Penang. In June, 1912, however, we obtained a series from the island of Sri Buat, off the Pahang Coast, on the east side of the Peninsula. Like the majority of the local Sun-birds (excluding the Spider hunters) this species only occurs in the littoral belt and is rarely, if ever, found far inland. Formerly, according to Mr. C. B. Kloss, it was common at Tanjong Katong, in Singapore Island, but is seldom seen there now. Mr. Seimund found it common at Pulau Pintu Gedong, Klang Straits, Selangor, in September and October, 1912. It is, therefore, probably largely confined to mangroves.

PIPRISOMA EVERETTI (SHARPE).

Prionochilus everetti, *Sharpe, Ibis*, 1877, p. 16; *id. P.Z.S.* 1879, p. 343, pl. xxx, fig. 1, *Id. Cat. Birds Brit. Mus.*, x., p. 76 (1885).

I have referred to this species with some hesitation a single male specimen obtained at Rawang, Selangor, in July, 1912. It differs from the type description and the figure as cited above in being a much darker tint above, greyish not brown, and in having the sides darker grey, not nearly uniform with the middle of the belly as shown in the figure. The habitat of *P. everetti* is given as Western Borneo and the island of Labuan but in the absence of a series and direct comparison with the type the differences are not sufficient to justify me in describing the bird before me as a new species.

The present specimen was shot while feeding on a mistletoe on the boughs of a lofty tree in swampy jungle.

PARUS CINEREUS, VIRILL.

Parus cinereus; *Gadow, Cat. Birds Brit. Mus.*, viii., p. 16 (1883).

Parus atriceps, *Ogilvie Grant, Fascic. Malay Zool.*, iii., p. 77 (1905).

This tit has not hitherto been recorded from the southern part of the Malay Peninsula though it was met with by myself on the coast of Patani, and by Dr. Abbot on the coast of Trang, about 150 miles north of Penang. In September and November, 1912, Mr. Seimund, however, found it abundant among the mangroves on Pulau Pintu Gedong, at the entrance to Klang Straits, Selangor coast, together with *Zosterops aureiventer*.

LIST OF A SMALL COLLECTION OF BIRDS AND MAMMALS FROM GUNONG KERBAU, PERAK.

By HERBERT C. ROBINSON, C.M.Z.S., M.B.O.U.

GUNONG Kerbau, in Kinta, near the Perak-Kelantan boundary but entirely in Perak, is the second highest mountain in the Malay Peninsula, attaining a height of 7,170 feet—only 12 feet less than Gunong Tahan.

It has been ascended on numerous occasions, the first occasion being by the French traveller De Morgan,¹ and an interesting account of the mountain is given by him and more recently by Mr. Scrivenor² (who calls it Gunong Riam) and reproduces some interesting photographs of the mountain.

With the exception of a few plants secured by the native plant collector attached to the Penang Botanic Gardens, who accompanied Mr. Barnard, Deputy Conservator of Forests, Perak, on his ascent, no collections whatever have been made on the mountain.

I therefore made arrangements to despatch a party of Dyak collectors thither, and, after the usual difficulties in the matter of transport, they established themselves at a height of rather over 5,000 feet, and collected from there to the summit and down hill to about 3,000 feet.

As the flora was likely to prove of more interest than the fauna, the greater part of their time was devoted to plant collecting, and a considerable number of species secured, which will be reported on in due course by Mr. Ridley.

The collections were made between the end of February and the end of March, and a list of the mammals and birds is given below, but as will be seen the mountain has yielded little of special importance.

Thanks are due to the Forest Department for assistance rendered in the matter of obtaining coolies, who were only secured with great difficulty and proved a very poor lot when obtained. Without this help our men would not have been able to work the hill as collecting impediments are weighty and bulky.

¹ "Explorations dans la presqu'île Malaise." *Bulletin de la Société Normande de Géographie*, VIII, pp. 143, 211 and 281 (1886).

² "Gunong Tahan and Gunong Riam." *Journ. Straits Branch Roy. Asiat. Soc.* No. 23, pp. 8-21, Pls. I, IV (1912).

MAMMALS.

The mammals did not prove interesting and, as is always the case in districts inhabited by large numbers of Sakai, were very scarce.

The following species only were obtained :

1. *MUSTELA FLAVIGULA PENINSULARIS*, BONHOTE.

1 ♀.

2. *SCIURUS ERYTHRÆUS RUBECULUS*, MILLER.

1 ♂, 1 ♀.

Rather more ochreous on the head than is usual in specimens from the Selangor main range.

3. *TAMIOPS MACCLELLANDI NOVEMLINEATUS*, MILLER.

2 ♀.

Typical specimens of this race.

4. *SCIURUS TENUIS TAHAN*, BONHOTE.

A single female. Is rather intermediate between the lowland and the mountain race.

5. *LARISCUS INSIGNIS JALORENSIS*, BONHOTE.

1 ♀.

By no means typical being much more rufous beneath and on the thighs, in this respect approaching specimens from Singapore and southern Johore. Approached in this respect by a specimen from Bukit Kutu, Selangor, 3,000 feet, and possibly indicating a distinct mountain race. The area between the black back stripes is not however tinged with rufous as in the southern form above mentioned, *Lariscus insignis meridionalis*.

6. *EPIMYS CREMORIVENTER*, MILLER.

Two quite typical females.

7. *TUPAIA FERRUGINEA*, SUBSP.

A single female. Specimen approaches the more northern forms in the much less ferruginous upper surface and in the paler under surface to the tail.

BIRDS.

The birds also were of no particular interest, the avifauna being precisely similar to that of the Batang Padang mountains, some forty miles to the south, which has been very exhaustively studied.

Our collectors were therefore instructed not to make unnecessarily large collections but to specially search for any species unfamiliar to them; it may therefore be taken as reasonably certain that no species unrecorded from the Malay Peninsula has escaped their notice.

The following species were actually obtained :

1. *ARBORICOLA CAMPBELLI*, ROBINSON.

1 ♀.

2. SPHENOCERCUS SEIMUNDI, † ROBINSON.

A series of fine adult males of this beautiful wedge-tailed green pigeon, hitherto known from five other specimens only.

3. PYROTROGON ERYTHROCEPHALUS, GOULD.

2 ♂.

4. CHOTORHEA CHRYSOPOGON, TEMM.

1 ♂.

5. CYANOPS OORTI, MULL.

2 ♂.

6. CHRYSOPHLEGMA WRAYI, SHARPE.

1 ♂.

Not yet found off the main range of the Malay Peninsula.

7. PSARISOMUS DALHOUSIÆ, JAMESON.

2 ♀.

8. HEMICHELIDON FERRUGINEA, HODGS.

2 ♀.

Common and resident on most high hills of the Peninsula.

9. CYORNIS CONCRETA, S. MULL.

A fine pair of this widely spread but by no means common fly-catcher.

10. CYORNIS DIALILEMA, SALVAD.

A single female, which I have with some hesitation referred to this species which is widely spread at moderate elevations throughout the Peninsula.

11. NILTAVA SUMATRANA, SALVAD.

A single adult male identical with the bird that I described as *Cyornis malayensis*, from Batang Padang, but which I have since found to be identical with the above-named form. It comes in a group including *C. vivida* from Formosa and *C. outesi* from Tenasserim and is very doubtfully congeneric with the other species in the genus though it cannot, I think, be classed as a *Niltava*. There is also a *Cyornis sumatrensis*, Sharpe, but the question whether two specific titles such as *sumatrana* and *sumatrensis* are admissible in one genus may be left to zoological purists.

12. NILTAVA DECIPIENS, SALVAD.

1 ♂.

Widely distributed on every mountain over 3,000 feet as far south as the southern border of Selangor.

13. POLIOMYIAS LUTEOLA, PALL.

A pair.

Apparently not a resident species.

14. MUSCICAPULA MALAYANA, OGILVIE GRANT.

A single male.

15. TERPSIPHON AFFINIS, BLYTH.

A single immature male in rufous plumage. Not usually found at high elevations.

16. PERICROCOTUS MONTANUS, SALVAD.

A single female.

One of the commonest of mountain birds.

17. HEMIXUS CINEREUS, BLYTH.

1 ♀.

18. IOLE PERACENSIS, HARTERT AND BUTLER.

One pair.

19. CRINIGER OCHRACEUS, MOORE.

1 ♂.

All very common birds.

20. TROCHALOPTERON PENINSULÆ, SHARPE.

2 ♂.

21. GAMPORHYNCHUS SATURATION, SHARPE.

Two males of this rather rare bird which is only common on the Semangko Pass, Selangor-Pahang boundary. The types were obtained in the Batang Padang mountains.

22. MELANOCICHLA LUGUBRIS, S. MULL.

5 ♂, ♀.

Common here as elsewhere on the main range at over 3,000 feet.

23. DRYMOCATAPHUS TICKELLI, BLYTH.

1 ♀.

On all the hills of the main range but not in Larut.

24. TURDINULUS GRANTI, RICHMOND.

1 ♀.

A submontane bird, not as a rule attaining any considerable elevation.

25. CORYTHOICHLA LEUCOSTICTA, SHARPE.

3 ♂.

Almost the commonest of all the hill birds.

26. ALCIPPE PERACENSIS, SHARPE.

1 ♀.

27. BRACHYPTERYX WRAYI, GRANT.

1 ♂, 1 ♀.

Not very common anywhere and generally found among the brushwood near the summits of the hills.

28. SIVA MALAYANA, HARTERT.

2 ♂, 2 ♀.

29. SIVA SORDIDIOR, SHARPE.

1 ♂.

Both these species are common on the main range, but the former is not found in Larut.

30. HERPOENIS ZANTHOLEUCA, HODGS.

1 ♀.

Of very wide altitudinal range, being found from sea-level to over 6,000 feet.

31. MESIA ARGENTAUROS, HODGS.

1 ♂, 1 ♀.

32. PNOEPYGA LEPIDA, SALVAD.

1 ♀ imm.

A very immature bird uniformly dark beneath.

33. HYDROCICHLA RUFICAPILLA, TEMM.

2 ♂.

Common along mountain torrents everywhere in the Peninsula.

34. LARVIVORA CYANEA, PALL.

1 ♂.

Probably only a seasonal visitor, though some individuals may remain throughout the year.

35. COPSYCHUS MUSICUS, RAFFLES.

1 ♂.

The common "Straits Robin" is of accidental occurrence away from human habitations.

36. PHYLLERGATES CINEREICOLLIS, SHARPE.

1 ♂.

37. MELANOCHLORA FLAVOCRISTATA LAFR.

2 ♂.

The Sultan Tit ranges from the lowlands up to about, 5,500 feet.

38. BHRINGA REMIFER, TEMM.

1 ♂.

Common on nearly all the hills.

39. ORIOLUS CONSANGUINEUS, WARDL-RAMS.

1 ♂.

The red and black Oriole is local in its distribution but fairly common wherever found.

40. MOTACILLA MELANOPE, PALL.

1 ♂.

A seasonal visitor.

ON A COLLECTION OF PLANTS FROM GUNONG MENG-KUANG LEBAH, SELANGOR.

By H. N. RIDLEY, M.A., (M.G., F.R.S.

LATE DIRECTOR OF GARDENS, STRAITS SETTLEMENTS.

[The collection reported on by Mr. Ridley was obtained in January and February, 1913, by the Dyak collectors of the Federated Malay States Museum on Gunong Mengkuang Lebah at a height between 4,800 and 5,800 feet. The mountain is a long razor backed ridge, gently sloping upwards from S.S.E. to N.N.W. on the main peninsular range dividing Selangor from Pahang, and has been visited on numerous occasions within the last few years though this is the first considerable botanical collection therefrom.

The present gathering represents the flora of the uppermost zone only but the mountain is heavily forested throughout. Up to about 2,500 feet various species of bamboo are very common and are succeeded above that level by a zone of palms, amongst which *Licuala* and a form of *Livistona* close to *L. tahanensis*, Becc, are the most characteristic. As in other hills the vegetation close to the main ridge becomes knarled and stunted and densely carpeted with wet moss. It is in this zone that the various species of *Rhododendron* are mainly found while amongst the herbaceous plants two species of *Burmansia* are the most conspicuous. A giant species of *Pandanus*, from which the mountain takes its name, is very common as is also a very slender *Calamus* affording an excellent rotan. *Kayu manis* or cinnamon, but of little commercial value, is also very abundant. The characteristic zerophytic vegetation to which Mr. Ridley alludes is only found on knolls and hillocks on the extreme summits and ridges while thirty feet down the "rain forest" zone is entered. The whole of both zerophytic and rain forest zone is very dense and tangled and only traversable with great labour except where game tracks, made by the larger Malay rhinoceros *R. sondaicus*, (which is fortunately numerous), occur. The formation is granite throughout and the summit ridges for the last two or three hundred feet consist mainly of enormous boulders piled one on each other.

The fauna, which is now well known, is that of the other mountain tops of the main range, but bears and siamang are numerous. The former are very fond of the cinnamon bark.—H. C. R.]

The collection obtained on this mountain is very representative of the general flora of the higher ranges of the Malay Peninsula. It is interesting to note that in species which have adapted themselves to these mountain tops there is a great tendency to a shortening of the branches, accompanied by a thickened and more coriaceous foliage, which also has a tendency to become more rounded in outline and blunt or even retuse at the tip. This is illustrated in this collection

by such plants as *Calophyllum rotundifolium*, *sp. nov.*, *Eugenia Wrayii*, King, and *Eugenia spissifolia*, *sp. nov.*, the leaves of all three being remarkably similar in outline and texture.

There are no less than 27 new species in this gathering including three new rhododendrons, a new oak and a remarkable species of *Ilex* most resembling a species from Kinabalu in Borneo.

LIST OF FLORA.

MAGNOLIACEÆ.

1. *ILLICIAM CAMBODIANUM*, Hance.

Distrib.—Mountains of the Malay Peninsula, Cambodia.

ANONACEÆ.

2. *POLYALTHIA PULCHRA*, King.

Distrib.—Mountains of Perak and Ulu Pahang.

3. *GONIOTHALAMUS MALAYANUS*, Hooker fl.

Distrib.—Malacca and Perak, usually in the low country.

POLYGALACEÆ.

4. *POLYGALA MONTICOLA*, Ridley.

Distrib.—Mountains of Perak and Selangor.

GUTTIFERÆ.

CALOPHYLLUM ROTUNDIFOLIUM, *sp. nov.*

Branches dark-coloured. Leaves crowded, opposite, stiffly coriaceous, sessile, broadly elliptic (lower ones) to orbicular, apex retuse, base cordate, above prominently nerved with close horizontal parallel nerves, beneath paler and nearly smooth, 2.5-4 cm. long, 2.5-4 cm. wide. Flowers solitary or two, terminal on the branches, on peduncles 1 cm. long shorter than the leaf. Outer sepals coriaceous, orbicular, 0.8 cm. long, inner sepals oblanceolate, obtuse, 0.2 cm. long. Petals obovate rounded, with a distinct claw 1 cm. long, 0.9 across. Stamens shorter than the petals with small oblong anthers.

A most distinct and pretty species with large solitary flowers 2 cm. across and remarkable rounded leaves.

TILIACEÆ.

6. *ELÆOCARPUS GLABRESCENS*, Masters.

Distrib.—Penang Hill and Kedah Peak.

7. *ELÆOCARPUS ERIOBOTRYOIDES*, *sp. nov.*

Branches moderately stout. Leaves coriaceous, lanceolate, apex acuminate, base cuneate, margins shortly serrate, nerves six pairs in-arching some way from the margin, reticulations wide, nerves and reticulations less conspicuous

above and midrib depressed. Adult leaves quite glabrous, young leaves at first silvery-silky along the edge. Adults 13-14 cm. long, 3-4.5 cm. wide, petiole, 2-5.3 cm. long. Racemes axillary from just below the leaves on the old wood, numerous, 5 cm. long. Flowers secund, twelve or more on pubescent pedicels 0.8 cm. long. Buds conic, hardly acute. Sepals, five lanceolate acuminate from a broader base, pubescent 0.6 cm. long, 0.15 cm. across. Petals as long, narrow, oblong cuneate, apex fimbriate with short fine processes, base silky-hairy especially along the edge. Stamens with short filaments and much longer pubescent blunt anthers. Style longer than the perianth, silky pubescent, tip bent at an angle, ovary and disc silky.

Allied to *E. monticola*, Ridley, from Gunung Tahan

8. *ELÆOCARPUS* (§ *ACRONODIA*) *LEPTOMISCHUS*, *sp. nov.*

Branches dark-coloured. Leaves ovate lanceolate, acuminate, blunt, base rounded, margins crenulate, coriaceous; nerves, seven pairs, reticulations fine, elevate beneath, 5.5-6.5 cm. long, 2.5 cm. wide, petiole slender, black, thickened and bent at the tip 5 to 6 cm. long. Racemes numerous among the upper leaves, 5-6 cm. long, flowers numerous, pendent, on silky pubescent pedicels, 0.5 cm. long. Buds conic, subacute, 0.2 cm. long. Sepals four lanceolate, silky outside. Petals, four, oblong cuneate, apex fimbriate with about 12 short processes, subglabrous outside, woolly at the base within. Stamens with short filaments; anthers narrow apiculate, glabrous. Ovary and disc silky hairy. Style silky pubescent.

Allies to *E. Mastersii*, King, but with rounded bases to the leaves, with distinct fine reticulations and apiculate anthers. All the specimens are in bud or in young fruit.

GERANIACEÆ.

9. *IMPATIENS ONCIDIODES*, *Ridley*.

Distrib.—Pahang, Perak and Selangor, from about 3,000 feet upwards.

OLACINÆÆ.

10. *GOMPHANDREA LANCEOLATA*, *King*.

Both the common typical form and a variety with ovate leaves broadly rounded at the base.

Distrib.—The mountains of Malacca, Selangor, Perak and Penang: common.

ILICINÆÆ.

11. *ILEX EPIPHYTTICA*, *King*.

Distrib.—Perak and Pahang mountains, from about 3,000 to 5,000 feet.

12. *Ilex myrtillus*, *sp. nov.*

A shrub, much branched, with small alternate, thickly coriaceous leaves, elliptic to obovate, obtuse or retuse narrowed to the base, nerves quite invisible on both surfaces, except the midrib, channelled above and elevate beneath, 1.5 cm. long, 1 cm. wide, petiole, 0.2 cm. long. Flowers in terminal or axillary short panicles or racemes, much shorter than the leaves, pubescent, pedicels 0.1 cm. long, pubescent. Sepals, four ovate or half orbicular pubescent, obtuse. Corolla 0.3 cm. across, petals, four ovate, glabrous longer than the calyx, connate at the base. Stamens, three, adnate to the top of the tube alternate with the lobes, filaments thick, anthers subglobose, rather large. Ovary short conic, stigma minute.

This species is remarkable for the very thick small thickly coriaceous obovate leaves and small flowers. It is nearest to *Ilex vacciniifolia*, Stapf. of Kinabalu.

CELASTRINEÆ.

13. *Euonymus wrayi*, *King*.

Distrib.—Perak and Pahang mountains, usually at about 5,000 feet. More rarely on limestone rocks in the low country.

LEGUMINOSÆ.

14. *Bauhinia kingii*, *Prain*.

Distrib.—Mountains of Perak and Selangor, from 1,000 to 4,500 feet.

ROSACEÆ.

15. *Pygeum griffithii*, *Hooker fil.*

Distrib.—Mount Ophir at about 4,000 feet.

SAXIFRAGACEÆ.

16. *Polyosma ilicifolia*, *Blume*.

A fine series of this confirms my opinion based on specimens from the adjacent mountain, Menang Gasing, that *P. parviflora*, King, is really a very young state of this species. The flowers when fully developed are as large as those of Javanese and Australian specimens.

Distrib.—Perak and Selangor, from 4,000 feet upwards. Also Java and Australia.

17. *Polyosma coriacea*, *King*, var. *minor*.

Leaves more lanceolate and narrower, the flowers less silky pubescent outside, occurring with the typical form.

Distrib.—Perak and Pahang mountains.

RHIZOPHOREÆ.

18. *Carallia eugenioides*, *King*.

Distrib.—Mountains of Perak.

MYRTACEÆ.

19. *LEPTOSPERMUM FLAVESCENS*, var. *COMMUNE*, *Benth.*

Distrib.—Common on all the mountains of the Malay Peninsula from about 4,000 feet upwards to 7,000 feet. Malacca, Pahang, Selangor, Perak and Kedah; also in the Malay Archipelago and in Australia.

20. *EUGENIA VALDEVENOSA*, *Duthie*.

Distrib.—Penang and Perak, from 2,500 feet upwards.

21. *EUGENIA SELANGORENSIS*, *sp. nov.*

Branches stout. Leaves thickly coriaceous, elliptic, with a short deflexed point, base cuneate, nerves numerous, fine, secondary nerves nearly as prominent, midrib elevated on the back, depressed above, 8-9 cm. long, 4-5 cm. wide, petiole thick, grooved above, 1 cm. long. Panicle shorter than the leaves, 5 cm. long with numerous thick four-angled branches, 0.3 cm. in diameter. Buds 0.6 cm. long; calyx tube campanulate, tapering to the base, smooth, 0.9 cm. long, 0.5 cm. through at the apex, lobes, four, short, ovate, obtuse. Petals small, obovate rounded, bigger than the calyx lobes.

Stamens numerous, filaments slender twice as long as the petals.

In some respects, especially in the form of the flower, this resembles *E. lepidocarpa*, Wall, but the calyx is not ribbed, the leaves are thicker and the nerves much more numerous.

22. *EUGENIA WRAYI*, *King*.

Distrib.—Perak mountains at Ulu Batang Padang, 5,000 to 5,600 feet.

The form from the highest point differs in its denser, rounder and even retuse leaves. The fruit (hitherto undescribed) is 1 cm. long globose, crowned by the short low annular calyx limb. It appears to have been somewhat pulpy.

23. *EUGENIA SPISSIFOLIA*, *sp. nov.*

A shrub with crowded coriaceous sessile leaves, elliptic to orbicular, retuse, base cordate, nerves faint on both sides, about 10 pairs, secondary nerves nearly as conspicuous, 3-4 cm. long, 2.5-4 cm. wide. Panicles terminal, shorter than the leaves, or elongating beyond them 2.5-7 cm. long with short branches. Peduncles and pedicels (0.2 cm. long) short and rather thick. Buds clavate, 0.7 cm. long when open. Calyx tube rather long, dilate upwards, lobes, four, ovate, short. Petals very small, hardly longer than the calyx, lobes white, orbicular ovate. Stamens numerous, very short 0.1 cm. long, hardly longer than the petals.

This plant is very like *E. Wrayi* in habit and form of leaves but is quite distinct in the long calyx tube, club-shaped buds, the fewer nerves to the leaf and the very short stamens.

24. *EUGENIA RHOMBOIDEA*, *sp. nov.*

Branches rather strict, dark. Leaves obovate acuminate to rhomboid or lanceolate, coriaceous, apex acuminate, obtuse, base more gradually acuminate, 3-4.5 cm. long and 1.7-1.9 cm. wide; nerves almost completely invisible on both surfaces, parallel, numerous, very fine, lower surface, finely punctate, petiole, 0.3 cm. long. Panicle short about 2 cm. long with four short branches each bearing three flowers. Peduncles rather stout, four-angled. Calyx tube elongate gradually dilating towards the tip, light brown and finely rugose when dry, 1 cm. long, 0.4 cm. wide at the tip, lobes, four, short, ovate, triangular. Petals calyptrate, orbicular, small. Stamens numerous, 0.2 cm. long.

This species resembles in appearance *E. Beddomei* of Southern India. It is, however, a typical mountain species, with small stiffly coriaceous leaves closely veined. In one gathering the specimens have obovate leaves, 4 cm. long by 2.5 cm. wide, but in most specimens the leaves vary from lanceolate to rhomboid. The calyx tube has a rough corky light brown exterior. The whole plant dries of a light greenish brown colour.

MELASTOMACEÆ.

25. *OXYSPORA HISPIDA*, *Ridley*.

Also collected here by Dennys.

26. *ANERINCLEISTUS GRANDIFLORUS*, *Ridley*.27. *SONERILA HIRSUTA*, *Ridley*.

Distrib.—Pahang and Perak mountains.

28. *SONERILA BRACHYANTHA*, *Stapf and King*.

Distrib.—Perak mountains.

29. *SONERILA RAMOSA*, *sp. nov.*

A much branched hairy shrub over a foot tall, branches four-angled covered with long bristly hairs; leaves narrow, lanceolate acuminate at both ends, sessile, margins serrate with a bristly hair on each tooth, both surfaces also bristly hairy, 5-6 cm. long, 1-1.2 cm. wide, slightly oblique. Flowers solitary, axillary, sessile or nearly so (fruit shortly stalked); calyx tube cylindric, slightly dilated above, 0.5 cm. long, lobes, six, lanceolate acuminate, all covered with red hairs. Petals, three, obovate, rather long clawed, apex rounded, white, 1.5 cm. long, 0.9 cm. wide. Stamens, three, long, curved, base orange, bilobed, lobes somewhat divaricate, apex slender, acuminate, white, 0.6 cm. long, filaments slender; style rather shorter than the stamens.

Capsule 0.5 cm. long, turbinate, cover with few tubercles bearing hairs (hairs deciduous); sepals, six, as long or shorter than the oblong rounded valves.

Most nearly allied to *S. fruticosa* of Gunong Tahan.

30. *MEDINILLA PERAKENSIS*, *Stapf*.

Distrib.—Perak mountains.

31. *MEDINILLA CLARKEI*, *King*.

This form differs from the typical plant in its larger, thinner lanceolate pointed leaves. In most other forms the leaves are obovate, rounded; it appears, however, to vary considerably in the form of the leaves according to local conditions. It occurs on many of the mountains of the Peninsula.

32. *PHYLLAGATHIS TUBERCULATA*, *King*.

Distrib.—Perak, on Bujang Malacca.

This splendid plant is very unlike any others of the species referred to this genus, from which it should probably be removed. King describes the stem as short. It, however, attains the height of six feet.

BEGONIACEÆ.

33. *BEGONIA MONTICOLA*, *sp. nov.*

A glabrous herb with a creeping rhizome. Leaves herbaceous, ovate, inequilateral, apex acuminate denticulate, the base with two shortly unequal rounded lobes, the larger 1 cm. longer than the shorter one; margins obscurely denticulate, distinctly so on the apical point; nerves, 10, five rising from the base, the others from the midrib; 10 cm. long, 6 cm. wide, the point 1 cm. long; petiole 14 cm. or more long. Scape, red, fleshy, 16–28 cm. long. Flowers few in the cyme. Male flowers, four petalled, two petals oblong obovate, two inner ones smaller but somewhat similar; anthers very shortly apiculate. Female flowers of four rounded, obovate, nearly equal petals, white; the whole flower, 3 cm. across. Capsule, 3-ringed, one wing broad, rounded 1.5 cm. long and as broad at the base, the others smaller bluntly triangular, 1 cm. long.

This species is allied most closely to *B. paupercula*, King, but differs in the presence of the two smaller petals, absent in that species in the male, and the nearly equal rounded petals of the female flower. The fruit closely resembles that of *B. Klossii*, Ridley, and so does the curiously dentate tip of the leaf, but the unequal leaf base separates it from that species.

ARALIACEÆ.

34. *ARTHEOPHYLLUM PINNATUM*, *Clarke*.

Distrib.—Mountains of Malacca, Perak and Penang.

35. *HEPTAPLEURUM AFFINE*, *King*.

Distrib.—Mountains of Perak, from 3,000 to 5,000 feet.

36. *HEPTAPLEURUM CEPHALOTES*, *Clarke*.

Distrib.—Singapore, Malacca, Perak and Penang.

GAMOPETALÆ

CORNACEÆ.

37. *VIBURNUM SAMBUCINUM*, *Reinw.*

Distrib.—Singapore, Malacca, Perak, Pahang and Penang.
Also Sumatra, Java and Borneo, from 3,000 to 5,000 feet.

RUBIACEÆ.

38. *ARGOSTEMMA HIRTUM*, *Ridley*.

Distrib.—Mountains of Malacca, Selangor, Pahang and Perak,

39. *ARGOSTEMMA YAPPII*, *King*.

Distrib.—Mountains of Perak and Selangor.

40. *ARGOSTEMMA DEBILE*, *sp. nov.*

Stem long, 19 cm. rooting along the ground and ascending, succulent glabrous. Leaves remote, few, in unequal pairs, the larger one lanceolate acuminate, fleshy herbaceous, shortly narrowed to the base, dark green above, pale beneath, nerves, five pairs, very fine and hardly visible, 5.5-6.5 cm. long, 2-2.5 cm. broad; smaller leaf, ovate, sessile, obtuse, 3 cm. long. Stipules lanceolate, acute 0.2-0.3 cm. long. Flowers, one to three, umbellate on a fleshy peduncle, 3 cm. long with pairs (one or two) of stipuliform bracts; pedicels 1 cm. long. Calyx rotate, lobes ovate sub-acute, 0.2 cm. long. Corolla, lobes, four, narrow lanceolate, linear acuminate, 1.1 cm. long, 0.3 cm. wide at the base. Stamens, anthers forming a narrow cone, 0.6 cm. long. Style longer, stigma clubbed.

Most nearly allied to *A. Hookeri*, King, but altogether larger.

41. *TIMONIUS EREOPHILUS*, *Ridley*.

Distrib.—Mountains of Malacca and Pahang.

42. *IXORA SALICIFOLIA*, *Blume*.

A new record for the Malay Peninsula. A native of Borneo and Java. The corolla lobes in the single specimen are blunter than in the ordinary form.

43. *IXORA PENDULA*, var.

With narrow lanceolate leaves and larger flowers than usual.

The species is common over the whole Peninsula from sea-level to 5,000 feet.

44. *IXORA GRANDIFOLIA* var. *ARBORESCENS*, *Hooker fil.*

Distrib.—Johore, Malacca and Perak.

45. *CEPHÆLIS SUBCORIACEA*, *sp. nov.*

Stem slender, woody. Leaves thinly coriaceous, broadly lanceolate to obovate acuminate acute, base cuneate; nerves, six to eight pairs, elevate beneath, 11 cm. long, 3.5-3.7 cm. wide, drying brown above, paler beneath. Petiole 0.3 cm. long, thick. Stipules, 2 cm. long, base tubular, embracing the stem for one-third of their length, limb lanceolate acuminate, brown, papery, upper ones more ovate, leaving a prominent ring when fallen. Flowers five or six in a sessile head 1.5 cm. across, pedicels short, thick, with the calyx tube, 0.4 cm. long. Calyx lanceolate acuminate acute 0.1 cm. long. Corolla tube, 0.6 cm. long dilate at the base and above and narrowed in the middle, lobes short, lanceolate obtuse 0.2 cm. long; tube within white, hairy in the mouth. Stamens adnate to the tube in the mouth, filaments short, anthers ellipsoid, bases rounded, rather large.

Very distinct from any of our other species in the foliage.

46. *LASIANTHUS NERVOSUS*, *King.*

Distrib.—Mountains of Perak.

47. *PSYCHOTRIA MULTICAPITATA*, *King (?)*.

Flowers too young to be quite certain of the identification.

48. *PSYCHOTRIA CONDENSEA*, *King and Gamble.*

Distrib.—Mountains of Perak and Pahang, from 3,000 to 5,000 feet.

49. *PSYCHOTRIA SARMENTOSA*, *Blume.*

A glabrous form.

Distrib.—The whole Peninsula, India and the Malay Archipelago.

VACCINIACEÆ.

50. *VACCINIUM DECORUM*, *sp. nov.*

A shrub with coriaceous leaves, obovate rounded at the tip, narrowed to the petiole, edges recurved when dry, dark-brown above, yellowish brown, gland-dotted beneath (when dry). Nerves, four pairs ascending from the midrib, not from the base, midrib, thick tapering gradually to the apex, 4-7 cm. long, 2.3-4.5 cm. wide, petiole 1 cm. long, stout. Racemes axillary, pendent, 9 cm. long, numerous. Flowers secund, deflexed on slender pedicels 0.6 cm. long. Calyx

lobes triangular, often (but not always) ciliate along the margins, 0.1 cm. long. Corolla tube broadly cylindric slightly dilated in the middle, lobes short, acute, minutely pustular on the edges, scarcely 0.1 cm. long. Whole corolla 0.5 cm. long, 0.4 cm. through, glabrous. Stamens, eight, shorter than the tube, filaments broadly linear as long as the anther cells, densely silky hairy. Anther cells oblong, terminal processes as long, linear broad, parallel, glabrous, no basal appendages. Style as long as the tube, thick, glabrous, stigma hardly lobed. Fruit (not quite ripe) spreading, on pedicels 1 cm. long, semiglobose, glabrous, pustular, crowned with the erect calyx lobes and the longer pulvinate disc, depressed in the centre 0.5 cm. long, 5-celled with numerous angled seeds.

This handsome and floriferous species is allied to the imperfectly known *V. visicifolium*, King and Gamble, from which it differs in the shape and venation of its leaves and the five-celled fruit. It is allied to *V. Teyssmanni*, Miquel, but has smaller leaves and different flowers.

51. *VACCINIUM ARDISIODES*, *sp. nov.*

A shrub with slender dark-coloured branches and coriaceous glabrous elliptic lanceolate leaves shortly acuminate at the tip, narrowed at the base, above smooth, dark brown when dry, beneath cinnamon brown, gland-dotted. Nerves, two pairs, rising from near the base of the midrib and running upwards and one pair rising from the upper part of the midrib but more spreading, all slender, midrib elevate on the back depressed above, 3 cm. long, 1.3 cm. wide, petiole 0.2 cm. Racemes shorter than the leaves, 2.5 cm. long. Flowers secund on pubescent pedicels 0.5 cm. long. Calyx pubescent, tube cup-shaped, lobes as long as the tube. Corolla glabrous, 0.4 cm. long, ovoid with small acute lobes. Stamens, 10, filaments hairy, flat, base broadly linear, narrowed upwards, twice as long as the small ellipsoid anthers, processes terminal, two, small, globose, yellow, no basal processes. Style thick, twice as long as the stamens, stigma rounded, disc white, hairy.

Allied to *V. Kunstleri*, King and Gamble, but the sepals are larger, the corolla lobes acute, the anthers smaller with different processes and the flowers and leaves smaller.

ERICACEÆ.

52. *RHODODENDRON CORUSCUM*, *sp. nov.*

Branches stout, woody. Leaves coriaceous, oblanceolate or oblong lanceolate apex obtuse or shortly acute, base narrowed obtuse, midrib stout, narrowing to the apex, elevate beneath, depressed above. Nerves 12 pairs, slender,

slightly ascending, reticulations small, fine and conspicuous, glabrous, with no scales or gland dots, 12-13 cm. long, 4-4.5 cm. wide, petiole, 2.5 cm. long, rugose. Flowers in a head of 10 to 12, bracts coriaceous, lowest ones lanceolate, 3 cm. long, upper ones 1 cm. obovate, rounded, often split, all silvery pubescent, lowest one silky hairy. Calyx flat with five short teeth, hairy. Corolla broadly bell-shaped, tube short, widely dilate, 4 cm. long, limb 5 cm. across, lobes broad, bluntly rounded, ovate, 2 cm. wide across the top. Stamens not exsert, shorter than the style, filaments fairly stout, glabrous. Anthers oblong, truncate, curved. Style stout, longer. Stigma broad, pistil cylindric, short stout glabrous.

The flowers appear to have been white with perhaps some dark colouring at the base of the tube. The young bud leaves are scaly but otherwise there are no scales on the foliage. Of our species the plant appears to be nearest to *E. Wrayi*, King and Gamble, but has much thinner leaves, with longer petioles. The silky bracts of the inflorescence are very characteristic.

[This handsome *Rhododendron* is the dominant plant in the rain forest just below the comb of the ridges. It is a small lanky tree growing to about 25 feet whereas *E. Wrayi*, which is found on the hills above the Semangko Pass, is a short compact shrub growing on the actual summits in exposed situations. The flowers of the present species are somewhat translucent white, the tube at the base speckled with dark purplish—H.C.R.]

53. *RHODODENDRON JAVANICUM*, *Bennett*.

Distrib.—Perak, Kodah, Sumatra, Java and Celebes.

54. *RHODODENDRON CALOCODON*, *sp. nov.*

A small shrub, probably epiphytic, with dusky rough branches. Leaves in whorls of six obovate to rounded, base shortly narrowed and obtuse, coriaceous, above smooth green, beneath yellowish, closely gland-dotted; nerves three pairs, almost always invisible. Midrib beneath thick, narrowing rapidly to the apex, above faintly depressed, 3 cm. long, 2 cm. wide or smaller, petiole very short 0.1 cm. Flowers solitary, terminal, on a pubescent pedicel 1 cm. long. Bracts in bud, numerous ovate obtuse glabrous, basals shortly mucronate, reddish. Calyx cup-shaped with short indistinct points, pubescent, 0.1 cm. long. Corolla cylindric campanulate 2 cm. long, mouth 1.5 cm. wide, dark red with white hairs outside and inside, lobes short oblong, apex broad retuse, 0.4 cm. long and 0.5 cm. wide. Stamens not exsert, shorter than the corolla, 10; anthers

oblong, truncate, filaments white-hairy. Style glabrous, much shorter than the stamens, thick; stigma capitate, large; ovary silky.

This pretty shrub belongs to the set of tubular-flowered *Rhododendrons* with small lobes to the corolla which hardly spread and thus is allied to *Rl. elegans* of Gunong Tahan and *Rh. spathulatum* of Gunong Kerbau but is larger than either.

55. *RHODODENDRON ORION*, *sp. nov.*

A shrub with wrinkled reddish brown branches. Leaves coriaceous in whorls of six or seven obovate, the base narrowed to the petiole, apex rounded, retuse, margin recurved, midrib, thick, elevated, sparingly scaly, depressed above; nerves four pairs indistinct, slightly elevate beneath, depressed above, 4.5 cm. long, 2.3 cm. wide, petiole 0.5 cm. long. Flowers numerous, terminal, six or more in the umbel, peduncle very short, covered with lanceolate acute glabrous bracts, pedicels slender, 2 cm. long scaly. Calyx saucer-shaped very small, margin obscurely lobed. Corolla short tubed, infundibuliform, tube widening upwards, scaly, lobes oblong ovate, obtuse, spreading scaly, 1 cm. long and 0.6 cm. wide; whole corolla, 2.4 cm. long, apparently yellow. Stamens exsert as long as the petals 2.4 cm. long, filaments slender, glabrous; anthers small 0.1 cm. long, oblong truncate. Style stout, glabrous, stigma large, capitate, ovary glabrous, scurfy. Capsule subfusiform, not twisted, 5-valved 5-ribbed scurfy-scaly, 1.3 cm. long.

Allied to *Rh. Scortechinii*, King and Gamble, but with less prominent nerves and longer stamens.

[On previous visits to the mountain I have met with this species as a small shrub growing in shady gullies; flowers pale yellow with an apricot tinge—H.C.R.]

56. *RHODODENDRON ROBINSONI*, *Ridley*.

A small specimen appears to be this plant.

Distrib.—Pahang mountains.

57. *RHODODENDRON MALAYANUM*, *Jack*.

Distrib.—Common on all the mountain ranges of the Malay Peninsula from 3,000 to 5,000 feet and also in Sumatra and Java.

58. *PERNETTYOPSIS MALAYANA*, *King and Gamble*.

Distrib.—Perak mountains to 6,500 feet.

59. *DIPLYCOSIA BRYTHEINA*, *King and Gamble*.

Specimens in fruit.

Distrib.—Perak, Java and Sumatra.

MYRSINACEÆ.

60. *MYRSINE PERAKENSIS*, *King and Gamble*.
Distrib.—Mountains of Perak and Pahang.
61. *EMBELIA CORIACEA*, *Wall*.
Distrib.—The whole of the Peninsula in the low country and mountains and also Java, Sumatra and Borneo.
62. *EMBELIA PERGAMACEA*, *A.D.C.*
Distrib.—Perak mountains, Java and Borneo.
63. *EMBELIA ANGULOSA*, *King and Gamble*.
Distrib.—Perak at Ulu Batang Padang; and Borneo, Kina-
 balu, 7,600 to 8,800 feet.
64. *EMBELIA MYRTILLUS*, *Kurz*.
Distrib.—Mountains of Malacca, Perak and Pahang.
65. *AEDISIA MONTANA*, *King and Gamble*.
Distrib.—Mountains of Perak and Selangor, 3,000 to 7,000 feet.
66. *AEDISIA ANDAMANICA*, *Kurz*.
Distrib.—Johore, Malacca, Perak. Also Andamans and Mergui.

STYRACEÆ.

67. *SYMPLOCOS SPICATA*, *Roxb.* var.
 This has lanceolate long acuminate leaves with nearly entire margins and most of the inflorescences are unbranched short racemes. It may prove to be specifically distinct.
68. *SYMPLOCOS OPHIRENSIS*, *Clarke*.
Distrib.—Malacca and Perak.

OLEACEÆ.

69. *LINOCIERA LANCIFOLIA*, *Ridley*.
Distrib.—Pahang mountains.

APOCYNACEÆ.

70. *ALYXIA FORBESII*, *King and Gamble*.
Distrib.—Mountains of Pahang, Perak and Penang; also in Sumatra and Java, from 2,500 to 5,000 feet.
71. *ALYXIA OLEIFOLIA*, *King and Gamble*.
Distrib.—Mountains of Perak.
72. *RANWOLFIA PERAKENSIS*, *King and Gamble*.
Distrib.—Pahang, Perak and Kedah, from sea-level upwards.
73. *ERVATAMIA CORIACEA*, *Ridley*.
Distrib.—Sempan Mines, Selangor, 4,000 feet.

ASCLEPIADACEÆ.

74. *MARSDENIA STELLARIS*, *sp. nov.*

A climber with a rather slender pubescent stem. Leaves in distinct pairs ovate lanceolate acuminate to lanceolate acuminate, apex acute, base rounded, subcordate, herbaceous, above dark green, beneath pale, petiole and midrib on both

surfaces shortly red hairy, the rest of the leaf sprinkled with short hairs; nerves almost invisible above, five pairs, in-arching 0.5 cm. from the edge, 5.5 cm. to 9.5 cm. long, 1.5-3.5 cm. wide, petiole, 2 cm. long. Peduncle axillary, 1 cm. long pubescent bearing three flowers on pubescent pedicles 1 cm. long. Calyx small, pubescent, lobes five, short ovate. Corolla rotate, tube very short, glabrous, lobes lanceolate acute 1.5 cm. across. Corona of five subcoriaceous yellow shining scales, attached to the staminal tube spreading, stellately rounded with acute tips, 0.2 cm. long. Stamens, filaments connate in a distinct tube at the base over 0.1 cm. long. Anther-appendages oblong ovate, obtuse, inflexed. Pollen oblong ovoid erect sessile on the carrier, which is nearly as long. Stigma large, rounded conic.

A single specimen.

The flowers appear to have been violet. The plant belongs to the section *Dregea* but has much larger flowers than any species from this region. I am indebted to Mr. N. E. Brown for help in working out this remarkable plant.

75. *DISCHIDIA CORDIFOLIA*, King and Gamble.

Distrib.—Perak mountains.

76. *DISCHIDIA PARVIFOLIA*, sp. nov.

Stem very slender. Leaves ovate acute with a distinct small cusp, base rounded, glabrous, fleshy. Nerves two pairs rising from the base, 1.2 cm. long, 1 cm. wide, petiole 0.2 cm. long. Peduncles, solitary, axillary, 0.1 cm. long or raceme nearly sessile, racemes 0.1-0.22 long, short and thick. Bracts minute, acute. Pedicels slender deflexed, 0.2 cm. long. Calyx lobes thin, ovate obtuse, corolla campanulate 0.3 cm. long, white, with five thickened acute triangular lobes, deep pink, all entirely glabrous. Corona none. Staminal column reaching to the throat, filaments straight, broad linear oblong; appendages thin, rounded oblong; pollinia oblong obtuse, or thin, flat, caudicles cuneate at the base, above dilate triangular, reflex, with two unequal points. Carrier very small, linear oblong, ovary conic cylindric. Follicle narrow lanceolate acuminate light brown, 4 cm. long, 0.2 cm. thick at the base. Seed 0.4 cm. long, oblong, brown, hairs from apex numerous, very fine, white, 1 cm. long.

The leaves are very small though bigger than those of *D. nummularia*, but much less fleshy. I can see no corona at all in the flower unless some obscure keels on the back of the stamens represent it. It much resembles a plant, of which, however, I have seen no flowers, collected by Beccari on Mt. Singalang, Sumatra.

LOGANIACEÆ.

77. *FAGRÆA GARDENIOIDES*, *sp. nov.*

A shrub with stout branches. Leaves fleshy coriaceous, obovate or oblanceolate, apex rounded, base narrowed acuminate, nerves seldom visible, three pairs only faintly marked on the upper surface, invisible beneath, 12-14 cm. long, 4.8-7 cm. wide, petiole stout, 1 cm. long with square truncate auricles at the base, 0.8 cm. long, 0.4 cm. wide. Flowers three terminal on thick pedicels 2 cm. long. Bracts at base of calyx obtuse ovate, 0.6 cm. long and as wide. Calyx 2.8 cm. long, sepals oblong oblanceolate, apices rounded 0.7 cm. wide. Corolla tube, straight, cylindric, 5 cm. long, 0.6 cm. in diameter, limb salver shaped, 7 cm. across, lobes oblong rounded, 3.5 cm. long, 1.7 cm. across. Stamens shorter than the corolla, filaments moderately thick, anthers 0.9 cm. long. Fruit ovoid, shortly beaked with the base of the style, 5 cm. long. At 5,000 to 5,600 feet.

Allied to *Fagræa carnosæ*, Blume, differing in the shorter, thicker corolla tube and larger limb and in the auricled petioles.

78. *GÆRTNERA KOENIGII*, var. *OXYPHYLLA*.

Distrib.—Mountains of Perak.

ACANTHACEÆ.

79. *FILETIS GLABRA*, *sp. nov.*

Glabrous. Leaves opposite, lanceolate acuminate, apex acute, base cuneate obtuse slightly inæquilateral, nerves seven pairs, nervules and reticulations visible, 13 to 15 cm. long, 5.5 cm. wide, petiole 1 cm. long. Inflorescence simply racemed or branched 15 cm. long, branches in fruit, 5 cm. long. Flowers few, scattered, nearly or quite sessile. Bracts narrow, lanceolate linear. Sepals lanceolate acuminate free to the base, pubescent, 0.4 cm. long. Corolla pubescent outside, lower lip very hairy, 1 cm. long. Stamens four, unequal glabrous; anthers rather large, cells one above the other. Ovary cylindric conic, style glabrous. Stigma very small, capsule 4-seeded, stalk (empty portion) longer than the seed bearing portion. Seed glabrous, verrucose elliptic.

Allied to *F. paniculata*, Clarke, but glabrous except for the slight pubescence of the flower. Like most of the species the texture of the leaves seems to have been somewhat fleshy and the whole plant dries black.

80. *JUSTICIA VEGETA*, *sp. nov.*

A tall stout glabrous plant. Leaves herbaceous lanceolate acuminate at both ends, apex acute, midrib broad at base, nerves 12 pairs parallel, curved upwards and in-arching near the margin, 18 cm. long, 6.5 cm. wide, petiole 2-4 cm.

all drying green, paler beneath. Racemes axillary, two to each node, 4 cm. long on peduncles 1 cm. long. Bracts green, oblong oblanceolate, tips rounded, midrib conspicuous 2 cm. long, 0.6 cm. across. Flowers solitary in the bracts. Calyx lobes thin, lanceolate, 0.4 cm. long, green. Corolla yellow with purple stripes 1.5 cm. long, upper lobe narrow subacute, lower one hairy, sparingly on the disc. Capsule 4-seeded hardly clubbed, nearly straight, shortly abruptly cuspidate, 1.2 cm. long. Seeds ovate acuminate brown, verrucose, 0.3 cm. long.

Allied to *J. selangorica* but the bract are not obovate as in that species.

GESNERACEÆ.

81. *AESCHYNANTHUS LONGICALYX*, var. *SUPERBA*.

Calyx dilated upwards 6.5 cm. ($2\frac{1}{2}$ inches) long, the lobes 0.8 cm. across at the base 3 cm. ($1\frac{1}{4}$ inches) long. Corolla 9 cm. ($3\frac{1}{2}$ inches) long. In the original description the flowers were much smaller, the calyx 1.25 inch long, the lobes being half an inch in length, the corolla 3 inches long. The calyx in this variety is nearly as long as the corolla tube, it is dilated widely upwards from the base, the lobes are rather ensiform than lanceolate. The style is shorter than the calyx with a large rhomboid stigma. The leaves vary from lanceolate acuminate to elliptic obtuse or ovate with a rounded base; there are four pairs of very faint nerves.

The original plant was found at the Semangko Pass and it was also collected by Scortechini and Wray on Gunong Batu Puteh in South Perak. Though the type form has considerably smaller flowers, with the calyx shorter in proportion to the corolla, I do not think it advisable to separate this splendid form specifically.

82. *DIDYMOCARPUS ALBINA*, *Ridley*.

Distrib.—Perak (Gunong Batu Puteh and Telom).

83. *ORCHADOCARPA LILACINA*, *Ridley*.

The lower lip is 2 cm. long and 1.7 cm. wide, the median lobe being 0.6 cm. long.

Distrib.—Gunong Batu Puteh, Perak.

APETALÆ.

84. *NEPENTHES SANGUINEA*, *Masters*.

Distrib.—High mountains of Malacca and Perak.

85. *NEPENTHES AMPULLARIA*, var.

There are no pitchers with the specimens of inflorescence but these seem to be only referable to this lowland species. They differ somewhat, however, in the laxer and less hairy panicle and longer linear bracts. I have never seen it from above 1,000 feet before.

PIPERACEÆ.

- 86.
- PIPER PENANGENSIS*
- ,
- A.D.C.*

Distrib.—Penang.

LAURINEÆ.

- 87.
- MACHILUS SCORTECHINII*
- ,
- Gamble*
- (?).

Flowers too young to make certain of the identification but it resembles this species otherwise.

Distrib.—Perak mountains.

- 88.
- PHŒBE DECLINATA*
- ,
- Nees*
- .

Distrib.—Singapore, North to Penang, from sea-level to 5,000 feet. Also in Sumatra and Java.

- 89.
- ACTINODAPHNE CONCINNA*
- ,
- sp. nov.*

Leaves in distant whorls of 4 to 5 at the end of the branches, thinly coriaceous, glabrous, lanceolate acuminate; nerves eight pairs slender, elevate, nervules subparallel, conspicuous beneath, above depressed and less conspicuous, leaf when dry grey above, paler beneath, 14 cm. long, 4 cm. wide, petiole 1 cm. long. Inflorescence capitate, subsessile, terminal or axillary below the leaves, 1 to 3 capitula together, 1 cm. long. In bud covered by ovate coppery pubescent obtuse bracts, 0.4 cm. or less long. Male flowers 0.5 cm. long, 0.7 cm. across, pedicel and tube short hairy. Perianth lobes, six, oblong obtuse, the outer three hooded, the inner three flat, all hairy outside. Stamens, nine, filaments slender, hairy. Anthers glabrous, oblong, 4-celled, inner three shorter than the perianth, each with a pair of glabrous, shortly stalked ovoid obtuse glands at the base. Pistillode ovary hairy, style glabrous. Stigma conoid, pustular. Female flowers and fruit not seen.

Allied to *A. pruinosa*, *Nees*, a lowland tree differing in its hardly glaucous leaves, oblong not ovate perianth lobes conoid stigma and other points.

- 90.
- LINDERA RUFA*
- ,
- Gamble*
- .

Distrib.—Mountains of Selangor, Perak, Borneo and Sumatra, from 4,000 to 7,000 feet.

- 91.
- LINDERA CÆSIA*
- ,
- Bærl.*

Distrib.—Perak and Selangor mountains and Java.

- 92.
- LINDERA*
- ,
- sp.*

Distrib.—Gunong Tahan, Pahang.

- 93.
- LINDERA SELANGORENSIS*
- ,
- sp. nov.*

Tree about 30 feet tall, branches pale when dry. Leaves alternate, distant, thin-textured, glabrous (except when young when they are silky pubescent) dark green above, glaucescent beneath, ovate acuminate, acuteuspidate;

nerves, six pairs, elevate beneath, anastomosing within the margin, depressed on the upper surface, nervules conspicuous, 6-18 cm. long, 4-2 cm. wide, petiole 1.5 cm. long. Racemes axillary, 0.5 cm. long, with very small rounded persistent bracts, peduncles 1 cm. long. Buds globose, 0.2 cm. long. Bracts rounded, semicircular. Flowers, six or more in a capitulum on hairy pedicels. Male flowers, perianth lobes, six, glabrous except for a few hairs on the base outside, oblong obovate, gland-dotted on both sides, apex rounded. Stamens nine, six paddle-shaped with flat linear filaments and broader anthers, the two cells distant and below the apex of the filament; inner three very small with two large oblong obtuse fleshy glands at the base. Female flowers and fruit not seen.

Also collected by myself at the Sempan Mines, Selangor, 4,000 feet. This is undoubtedly closely allied to *L. malaccensis*, Hooker fil., a common lowland tree from Singapore, northwards to Perak, but it differs in its thinner leaves, glaucous beneath, oblong rounded petals and longer racemes. *L. malaccensis* seems confined to edges of woods in the low country and I have never seen it in the hills.

The specimens with larger and thinner leaves referred to by Gamble in the "Materials for a Flora of the Malay Peninsula," Nos. 3,373 and 4,704, and from the Dalvey Road, Singapore, are merely from younger trees or younger branches of older trees as the character of the foliage differs somewhat in the same tree.

THYMELEACEÆ.

94. *WIKSTREEMIA CANDOLLEANA*, *Meisner*.

Distrib.—Mountains of Pahang, Perak and Kedah. Also in Java.

SANTALACEÆ.

95. *HENSLOWIA PLURINERVIS*, *Berl.*

Distrib.—Perak and Sumatra.

LORANTHACEÆ.

96. *LORANTHUS PENTANDRUS*, *Linn.*

Distrib.—The whole Malay Peninsula and Archipelago.

97. *LORANTHUS LOBBII*, *Hooker fil.*

Distrib.—In most mountain regions of the Peninsula.

98. *LORANTHUS CRASSIPETALUS*, *King.*

Distrib.—Perak.

99. *ELYSTRANTHE FORMOSA*, *Blume.*

Distrib.—Not rare in the Malay Peninsula. Also in Java.

EUPHORBIACEÆ.

100. *ANTIDESMA FALLAX*, *Muell. Arg.*
Distrib.—Singapore, Johore and Perak
101. *DAPHNIPHYLLUM SCORTECHINII*, *King.*
 Male flowers.
Distrib.—Mountains of Perak.

CUPULIFERÆ.

102. *QUERCUS BASSA*, *Blume.*
Distrib.—Mountains of Malacca, Pahang, Selangor, Perak and Penang, from 2,000 to 5,000 feet.
103. *QUERCUS ROBINSONII*, *sp. nov.*
 Branches stout dark coloured. Leaves coriaceous above brown when dry, beneath silvery, except the brown nerves, lanceolate acuminate, apex acute, base narrowed cuneate; nerves 11 pairs, elevate beneath, nervules transverse, parallel, 15 cm. long, 5 cm. wide. Spikes erect racemed, numerous terminal 8 cm. long on branches 12 cm. long, base (0.3 cm.) nude; rachis scurfy. Male flowers sessile, perianth lobes, six, short dentiform acute pubescent. Stamens, 12, anthers ellipsoid. Pistillode pulvinate silky. Bracts very small. Female flowers on separate spikes; styles, short, three. Fruit when young with the cupule covering the glans, and covered with short appressed triangular acute processes; adult, cupule thin, free from the glans except at the base and covering it all but the tip, splitting at the top into five irregular lobes, pubescent, faintly vertically ribbed but with no rings or processes, 1.5 cm. long, glans a little longer, ovoid, tapering at the tip, silky with the three persistent stigmas on a short style.
- This seems to be allied to *Q. Blumeana*, Korth. Differing in the silvery backs of the leaves and the absence of any belts or processes on the cupule.

MONOCOTYLEDONES.

ORCHIDÆÆ.

104. *LIPARIS DISTICHA*, *Lindley.*
Distrib.—Common in most parts of the Peninsula.
105. *PLATYCLINIS GRACILIS*, *Hooker fil.*
Distrib.—Perak and Pahang mountains.
106. *DENDROBIUM LONGIPES*, *Hooker fil.*
Distrib.—Mountains of Perak and Selangor.
107. *DENDROBIUM CORNUTUM*, *Hooker fil.*
Distrib.—Perak and Pahang mountains.

108. *DENDEOBIMUM ROSEATUM*, Ridley.*Distrib.*—Larut Hills, Perak.109. *BULBOPHYLLUM GALBINUM*, Ridley.*Distrib.*—Perak, Selangor and Pahang mountains.110. *BULBOPHYLLUM* (§ *MONANTHA PARVA*) *ARANIFERUM*, *sp. nov.*

Rhizome long, creeping, with abundant fairly thick roots, almost entirely covered above with adnate pseudobulbs. Pseudobulbs oblong, horizontally appressed to the slender rhizome, the short apices only free and upcurved, 1 cm. long, 0.3 cm. thick (when dry). Leaf elliptic lanceolate, apex shortly acute, base narrowed to the petiole, 5 cm. long (including the petiole) 0.8 cm. wide. Scape, rising at the base of the pseudobulb slender, one-flowered 5 cm. long with a lanceolate acuminate persistent sheathing bract 0.5 cm. long. Pedicel and ovary 2 cm. long. Sepals subequal, linear acuminate caudate, 4-nerved, the two central nerves thicker than the two outer ones, 3.2 cm. long by 0.5 cm. wide at the base. Petals linear obtuse 0.5 cm. long, all apparently whitish. Lip tongue-shaped acuminate, tip blunt, orange coloured, base cordate with sides thin rounded, apex fleshy grooved down the centre, 0.6 cm. long. Column short with subulate stielidia, foot narrow at first horizontal then rather abruptly up-curved. Anther rather large with a short distinct filament, pollinia oval elliptic.

I have only seen one flower.

This is undoubtedly allied to *B. striatellum*, Ridley, a native of the mangrove swamps in Singapore. It resembles *B. montense*, Ridley, and *B. catenarium* in the peculiar arrangement and form of the pseudobulbs. The long narrow caudate sepals are peculiar in this section.

111. *BULBOPHYLLUM CAPITATUM*, Lindley.

Apparently abundant. Common on all our mountain ranges from 2,000 to 6,000 feet. Also occurring in Borneo and Java.

112. *BULBOPHYLLUM SELANGORENSE*, *sp. nov.*

Rhizome long, branched, stout, woody over 0.5 cm. in diameter, densely covered with roots, pseudobulbs absent. Leaf oblanceolate coriaceous, apex blunt, base long, narrowed to the petiole, 18 cm. long, 4 cm. wide, petiole 8 cm. long. Scape about 30 cm. long, the basal half nude except for two or three sheathing bracts, the uppermost one foliaceous with a lanceolate acute limb, 5 cm. long. Raceme 15 cm. long, flowers rather scattered. Bracts lanceolate, 0.3 cm. long, shorter than the pedicel. Sepals lanceolate ovate acute, 0.3 cm. long, the lower pair connate at the base forming a rounded gibbous sac. Petals nearly as long, linear oblong

obtuse. Lip rather thin, the base broad with rounded elevate side lobes, apex acuminate, more fleshy, three raised veins run on the disc between the lobes from a horse-shoe-shaped callus at the base. Column short, stelidia subulate, foot adnate to sepals, apex only shortly free.

This is allied to *B. montigenum*, Ridley, and *B. oblanceolatum*, King, of the Pahang and Perak hills, differing in the shorter lanceolate ovate sepals and the large foliaceous bract on the scape.

113. *DENDROCHILUM ANGUSTIFOLIUM*, Ridley.

In fruit only.

Distrib.—Mountains of Pahang and Selangor.

114. *ERIA CRASSIPES*, Ridley.

Distrib.—Pahang (Gunong Tahan).

115. *ERIA (DILOCHIOPSIS) SCORTECHINII*, Hooker fil.

Distrib.—Mountains of Selangor, Pahang and Perak.

116. *ERIA ELATA*, Hooker fil.

Only previously known from Perak, collected by Scortechini without locality.

117. *ERIA (TRICHOTOSIA) PYREHOTRICHA*, *sp. nov.*

A tall stout plant with the appearance of *E. vestita*, Lindley. Stems, 1 cm. in diameter densely red-hairy. Leaves with red-hairy sheaths, 2 cm. long, lamina lanceolate acuminate hairy, 9 cm. long, 2.5 cm. wide with 3-7 nerves. Racemes pendulous flexuous red-hairy, 9 cm. long, basal bract ovate amplexicaul pale coloured, 1 cm. long, floral bracts remote lanceolate acuminate, 1.3 cm. long. Ovary sessile, hairy. Sepals, upper one lanceolate, 1 cm. long, lower ones triangular ovate, falcate, hairy base gibbous, 1 cm. long. Petals linear oblong, tip rounded glabrous, 3-nerved rather short; lip obcuneate, 3-lobed margins denticulate, lobes broadly rounded with several elevated veins papillose on the disc, mid lobe rounded not wider with lines of papillæ on it. Column at the tip quadrate with a large stigma.

This plant has been confused with *Eria ferox*, Lindley, hitherto, from which it differs in the longer acuminate more hairy leaves, longer raceme of flowers, large lanceolate bract, and much larger, more remote flowers. It has, in fact, much more of the habit of *Eria vestita*. It has previously been collected by Curtis (No. 1,325), King's Collector (3,360), at the top of the Larut Hills, and Scortechinii (366 b), probably in the same locality.

118. *CHEATOSTYLIS ERLIEDOIDES*, Hooker fil.

Rare.—Only previously collected in Perak.

119. *NEPHELOPHYLLUM TENUIFLORUM*, *Blume*.

Distrib.—Mountains of Pahang, Perak and Kedah. Also in Java and Borneo.

120. *CÆLOGYNE CARNEA*, *Hooker fil.*

Common in the mountains of Pahang and Perak.

121. *PHOLIDOTA CARNEA*, *Blume*.

A new record for the Peninsula but also collected on Gunong Inas by Yapp. A native of Java.

122. *PODOCHILUS LANCIFOLIA*, *Schlecht.*

Distrib.—Mountains of Pahang, Selangor and Perak.

123. *THELASIS MACROBULBON*, *Ridley*.

Distrib.—Mountains of Perak.

124. *CRYPTOSTYLIS ARACHNITES*, *Blume*.

Distrib.—Common on the hills of the Malay Peninsula and in the low country.

125. *HABENARIA ZOSTEROSTYLOIDES*, *Hooker fil.*

Distrib.—Mountains of Malacca, Pahang, Selangor and Perak.

SCITAMINEÆ.

126. *CAMPTANDREA OVATA*, *Ridley*.

Also on Gunong Ulu Semangko.

127. *GLOBBA PERAKENSIS*, *Ridley*.

Distrib.—Perak Hills.

128. *ALPINIA AURANTIACA*, *Ridley*.

Distrib.—Pahang.

Apparently this species, but the specimens are not in a good enough state to be sure.

LILIACEÆ.

129. *SMILAX CALOPHYLLA*, *Wall.*

Distrib.—The whole Peninsula, from sea-level to 5,000 feet.

130. *SMILAX LÆVIS*, *Wall.*

Distrib.—Mountains of Malacca, Perak, Penang and Kedah. Also in China.

AROIDEÆ.

131. *ARISÆMA ROXBURGHII*, *Kunth*.

Distrib.—Selangor, Perak, Pahang, Penang, Langkawi Islands and Java, from about 1,000 feet upwards.

132. *ARISÆMA SCORTECHINII*, *Hooker fil.*

Distrib.—Selangor, Pahang, Perak and Penang.

133. *SCINDAPSUS SCORTECHINII*, *Hooker fil.*

Distrib.—Mountains of the Malay Peninsula, from 3,000 to 5,000 feet.

FILICES.

134. *LECANOPTERIS CARNOSA*, *Blume*.
Common, especially in the hills.
135. *DAVALLIA DISSECTA*, *Blume*.
The specimens are not in fruit but very much resemble this species which has not previously been met with in the Malay Peninsula.
136. *ASPLENIUM TENERUM*, *Forst.*
More common in the low country than on the mountains.
137. *NEPHROLEPIS DAVALLIODES*, *Kze.*
Distrib.—Mountains of Selangor and Perak and also in Java.
138. *ELAPHOGLOSSUM LATIFOLIUM*, *Sw.*
Distrib.—Mountains of Pahang, Perak and Kedah.
139. *STENOCHLÆNA SORBIFOLIA*, *Linn.*
The slender creeping sterile state. Common all over the Peninsula.

LYCOPODIACEÆ.

140. *LYCOPodium PHLEGMARIA*, *Hook.*
Common all over the Peninsula.
-

ON A FURTHER COLLECTION OF MAMMALS AND BIRDS FROM THE HILLS OF NEGRI SEMBILAN.

By H. C. ROBINSON, C.M.Z.S., M.B.O.U., AND C. BODEN KLOSS, F.Z.S., M.B.O.U.

IN a recent number of this Journal one of us has given a list of a collection of mammals and birds obtained on the Telapa Buruh range in Negri Sembilan, which showed that the Himalaiaic element, which is the dominant feature of the fauna of the higher hills of Pahang, Perak and Selangor, does not extend so far south as Negri Sembilan, and this is confirmed by the present series. In September, 1913, the Dyak collectors of the Museum were sent to collect on Gunong Tampin, in the extreme south of the State, which attains a height of 2,507 feet and may be regarded as the southern termination of the Peninsular main range, hills of greater elevation in Malacca and Johore being quite isolated by wide tracts of low-lying country.

The collection, though not very extensive, contains several species of considerable interest, and we have therefore thought it worth while to give a list in full as it altogether includes six mammals and 25 birds not recorded in the two previous papers.

The party were camped at about 1,000 feet in heavy jungle, and collections were made from that elevation to the summit.

MAMMALS.

1. SYMPHALANGUS SYNDACTYLUS CONTINENTIS. THOMAS.

Hylobates syndactylus (Desm.); Flower, P.Z.S., 1900, p. 313; Robinson, Journ. Fed. Malay States Mus., i, p. 26 (1905).

A pair of large adults.

The Siamang is rather rare in the south of the Peninsula and is not usually found at low elevations.

2. HYLOBATES LAR (LINN.).

A large female in the black pelage.

3. RATUFA AFFINIS AUREIVENTER (GEOFFR.).

♂, 2 ♀.

Rather variable, one female having the hands and feet dark chocolate brown.

4. RATUFA MELANOPEPLA, MILLER.

2 ♂, ♀.

Apparently as common as the preceding on this hill.

* Robinson, Journ. F.M.S. Museums, i, p. 25, 1905-6.

Kloss, op. cit., iv, p. 219, 1909-11.

5. *SCIURUS VITTATUS MINIATUS*, MILLER.

♀.

Apparently rare.

6. *SCIURUS NIGROVITTATUS JOHORENSIS*, BOB & WROUGHT.

Journ. Fed. Malay States Mus, iv, p. 166 (1911).

2 ♂, ♀.

Agreeing well with the types.

7. *SCIURUS TENUIS TENUIS*, HORSE.

5 ♂, 3 ♀.

Common.

8. *SCIURUS ROBINSONI ALACRIS*, THOMAS.

♂.

• The southernmost recorded locality for this ground squirrel.

9. *PETAURISTA NITIDA MELANOTUS* GRAY

♂.

10. *LARISCUS INSIGNIS JALORENSIS*. BOWHOTE

3 ♂, ♀.

Belonging to the duller northern form and not to the brighter sub-species, *L. v. meridionalis*, from Southern Johore and Singapore Island.

11. *RHINOSCIURUS LATICAUDATUS TUPAIOMIS*, BIRTH.

♂.

Tail hoary, each hair with the tip pure white, basal portion buff.

12. *EPIMYS VOCIFERANS* (MILLER)

♀.

13. *EPIMYS PELLAX* (MILLER).

2 ♂, ♀.

It is curious that in this range of hills *E. pellax* seems to have supplanted entirely *E. suifer* which is elsewhere by far the commoner rat

14. *EPIMYS ASPER* (MILLER)

♀. Immature specimen not sexed

Tails rather short but the specimens are in indifferent condition.

15. *EPIMYS BATTUS JALORENSIS* (BOWHOTE).

2 ♀.

16. *TUPAIA FERRUGINEA FERRUGINEA*, RAFFLES

2 ♂, 4 ♀.

17. *TUPAIA MALACCANA*, ANDERSON

♂, ♀.

Much commoner in the south than in the north of the Peninsula and never yet met with on any of the adjacent islands.

18. *URSUS MALAYANUS*, RAFFLES.

A large female was shot as it was descending a tree after robbing a bee's nest.

BIRDS.

1. PTILINOPUS JAMBU (GM.).

6 ♂, 2 ♀.

This beautiful fruit pigeon elsewhere rather rare and decidedly local was common on the hill, feeding on fig trees.

2. CHALCOPHAPS INDICA (LINN.).

♂.

3. HUHUA ORIENTALIS (HORSF.).

♀.

Nowhere abundant, or at least, hard to get.

4. PHOTODILUS BADIUS (HORSF.).

♀.

5. CARCINEUTES PULCHELLUS (HORSF.).

2 ♂, 2 ♀.

6. NYCTIORNIS AMICTA (TEMM.).

1 ♂, 2 ♀.

7. HIEROCOCYX NISICOLOR (HODGS.).

♂.

8. ZANCILOSTOMUS JAVANICUS (HORSF.).

♂.

9. UROCOCYX ERYTHROGNATHUS (HARTL.).

2 ♂.

10. RHINORTHA CHLOROPHÆA (RAFFLES).

♂.

11. PYROTROGON NEGLECTUS, FORBES & ROBINSON.

♂, ♀.

12. PYROTROGON KASUMBA (RAFFLES).

♂.

This specimen has a narrow bar of scarlet on the rump above the upper tail coverts. The same abnormality has been noted in an adult male from Malacca (Ogilvie Grant, *Cat. Birds Brit. Mus.*, xvii., p. 484), but is apparently not constant.

13. CALORHAMPHUS HAYI (J. E. GREY).

♂, ♀.

14. CHOTORHEA CHRYSOPOGON (TEMM.).

♂, 2 ♀.

15. CHOTORHEA MYSTACOPHANES (TEMM.).

♂, 3 ♀.

16. CYANOPS HENRICI (TEMM.).

♂, 2 ♀.

17. PYRRHOPICUS PORPHYROMELAS (BOIR.).

♀.

18. MIGLYPTES GRAMMITHORAX (MALH.).

♂, 2 ♀.

19. MIGLYPTES TUKKI (Less).

♂

20. CHRYSOPHLEGMA HUMII, HARGITT.

♀

21. CALYPTOMENA VIRIDIS, RAFFLES.

2 ♂, 2 ♀.

22. EURLÆMUS OCHROMELAS, RAFFLES.

♂, 4 ♀.

23. CYORNIS CONCRETA (S. MULL).

Robinson, Journ. Fed. Malay States Mus., ii, p. 187 (1909).

♂.

This Flycatcher is normally an inhabitant of the high hills above 3,000 feet and has not hitherto been found south of Ginting Bidei in Selangor. It has also been shot on Gunong Tahan, between 500-1,000 feet, so that it is evidently not absolutely confined to the mountains.

24. HYPOTHYMIS AZUREA (BODD).

Hypothymis azurea prophata, Oberholser, Proc. U.S. Nat. Mus., 39, p. 597 (1911).

♂, ♀.

25. RHIPIDURA PERLATA, S. MULL.

♂.

26. TERPSIPHONE INCH, GOULD.

♂, ♀.

Rare in Malayan collections though not improbably commoner than it appears. Probably a seasonal visitor from China and Japan.

27. TERPSIPHONE AFFINIS (BIRCH).

♀.

28. PHILENTOMA VELATUM (TENN.).

2 ♀.

29. PHILENTOMA PYRRHOPTERUM (TENN.).

♂, 2 ♀.

30. CULICICAPA CEYLONENSIS (SWAINS).

2 ♂, ♀.

31. STOPAROLA THALASSINOIDES (CAB.).

♀.

By no means common in the south of the Peninsula.

32. PERICROCOTUS IGNEUS, BLYTH.

♂.

33. CHLOROPSIS ZOSTEROPS (VIG.).

♂.

34. CHLOROPSIS ICTEROCEPHALA (LESS).

3 ♂, ♀.

35. CHLOROPSIS CYANOPOGON (TENN.).

2 ♂.

36. *HEMIXUS CINEREUS* (BLYTH).

♂.

37. *HEMIXUS MALACCENSIS* (BLYTH).

4 ♂, ♀.

38. *MICROTARSUS MELANOCEPHALUS* (GM.).

2 ♀.

39. *MICROTARSUS MELANOLEUCUS* (EYTON).

♂, 2 ♀.

40. *CRINIGER TEPHROGENYS*, JARD. AND SEIDY.

♂, ♀.

41. *ALOPHOIUS PHLEOCEPHALUS* (HARTL.).

♂.

42. *PYCNONOTUS SIMPLEX* (LESS.).

♀.

43. *PYCNONOTUS SALVADORII*, SHARPE

♀.

44. *EUPETES MACROCERCUS* (TEMML.)

♂.

45. *POMATORHINUS BORNEENSIS*, CAB.

♂, 2 ♀.

46. *TURDINUS SEPIARIUS* (HORSF.).

Robinson, Journ. Fed. Malay States Mus., ii, p. 198 (1909).

♀

A submontane bird living in deeper jungle and at slightly higher elevation than the very closely allied *T. abbotti*, which is often found in secondary forest and orchard land.

47. *TURDINUS MAGNIROSTRIS* (BLYTH).

♂, 2 ♀.

48. *DRYOCATAPHTUS NIGROCAPITATUS* (EYTON).

♀

49. *ANUROPSIS MALACCENSIS*, HARTL.

3 ♀.

50. *CORATHOCICHLA STRIATA LEUCOSTICTA*, SHARPE

♂

The occurrence of a single male of this species on Gunung Tampin is rather surprising as throughout the Federated Malay States it is strictly confined to the higher mountains.

Incidentally it may be noted that the form is very doubtfully distinct from *C. brevicaudatus* (Blyth), *Journ. Asiat. Soc., Bengal*, xxiv, p. 272 (1855), from "the mountainous interior of the Tenasserim Province" with which it agrees in having the sides of the head ashy grey, not rufescent, and the spots on the tips of the wing coverts white, not fulvous.

Dr. Sharpe, in diagnosing the species, has given these characters as separating it from *C. striata*, but has omitted to compare it with *C. brevicaudata*, of which, at the time, there appeared to be no specimens in the British Museum, and all subsequent authors have followed his lead.

51 *TURDINULUS GRANTI*. RICHMOND.

Turdinulus humii, Robinson, Journ. Fed. Malay States Mus., i, p. 26 (1905).

♂ 4 ♀.

Commoner on the Negri Sembilan hills than anywhere else in the Peninsula.

52 *ALCIPPE CINEREA*. BLAIR.

♂.

53. *STACHYRIS DAVISONI*. SHAEPR.

3 ♂, 3 ♀.

54 *STACHYRIS POLIOCEPHALA* (TEMN.)

♂, ♀

55 *STACHYRIS LEUCOTIS* (STRICKL.)

2 ♂, 5 ♀

Common in Negri Sembilan but much rarer to the north

56 *STACHYRIS MACULATA* (TEMN.)

2 ♂

57 *CYANODERMA ERYTHROPTERUM* (BLAIR)

2 ♂, ♀

58 *HERPORNIS ZANTHOLEUCA* HODGES.

♂, ♀

59 *GEOCICHLA INTERPRES*. (TEMN.)

Geocichla avensis, Hume, Stray, Feath., viii, p. 39 (79); Oates, Faun. Brit Ind., *Birds*, ii, p. 138 (1890)

♀ Imm

In 1878 one of Hume's collectors obtained an immature thrush from the hills of Rembau, which was identified with the species described by Grey from a native drawing from a specimen procured in Upper Burma, while Dr. Abbott also collected specimens identified as *G. interpres* by Richmond on the hills of Trang, Western Siamese States, in 1896; no other examples have been recorded from the Malay Peninsula. Hume relied on the absence of a white wing bar in his specimen to separate it from *G. interpres*, but Oates, *loc. cit.*, states that the specimen is in moult and that the sprouting feathers appear to possess this feature which is fully developed in our specimen from Tampin. Our collectors confused the bird with immature *Hydrocichla ruficapilla* which affects similar situations and which they have been told not to collect in numbers, and this perhaps accounts for its not having been obtained before. Possibly also, as is the case with the other species of *Geocichla* in the Peninsula, the species is migratory.

There is, we think, little doubt that the nominal species, *G. avensis*, has no existence in fact.

♂. 60. *HYDROICHLA FRONTALIS* (BLUTH).

Very much rarer than the next species.

♀. 61. *HYDROICHLA RUFICAPILLA* (TEMM.).

♀. 62. *CITTOCINCLA MACRURA* (GM.).

♀. 63. *ACANTHOPNEUSTE BOREALIS* (BLAS.).

♀. 64. *LANIUS TIGRINUS*, DRAP.

2 ♂, 4 ♀. 65. *DENDROPHILA SATURATOR*, HARTERT.

♂, ♀.

Exceptionally deep in tone.

♀. 66. *DICURUS ANNECTENS*, HOEDS.

♀. 67. *ORIOLES ZANTHONOTUS*, HOEDS.

4 ♂. 68. *AETHOPYGA TEMMINCKI* (HOEDS.).

Common in the Negri Sembilan hills, replacing *Ae. siparaja* of the sea coast.

2 ♂, 2 ♀. 69. *ANTHOTHREPTES HYPOGRAMMICA* (S. MULL.).

♂, ♀. 70. *ARACHNOTHERA LONGIROSTRIS* (LATH.).

♂. 71. *PRIONOCHILUS IGNICAPILLUS*, EVANS.

♂, 2 ♀. 72. *PRIONOCHILUS MACULATUS*, TEMM.

MEASUREMENTS OF SOME BIDUANDA (MANTRA) OF ULU KENABOI, JELEBU.

By C. BODEN KLOSS, F.R.A.S.

(PLATES III-XIII).

IN January, 1912, while in Negri Sembilan, I heard of the presence of a small party of Biduanda (Mantra) at a Malay village in Ulu Kenaboi, and was able to pay them a flying visit.

The information obtained from the party themselves (I was unable to visit their homes) is corroborated by Mr. Evans in an article appearing in the present Journal and therefore need not be repeated, but the measurements taken, being somewhat more extensive than his, are given here together with a number of photographs from which physical characters, dress, and ornaments can be gathered. In complexion the Biduanda did not differ from the Malays, who were their neighbours.

The stature measurements of the women were 1363, 1406, 1375, 1440, 1510, 1434 and 1428 millimetres.

The majority of the party gave the name of their village as Kēnaboi Tikin, but Nos. 1, 2 and 11 came from Kenaboi Hilir.

Number ...	1	2	3	4	5	6	7	8	9	10	11	AVERAGE
	21	30	21	40	40	17	18	18	...	20	35	
Age	...	...	...	...	...	...	...	...	...	...	...	...
Character of hair	...	...	...	...	...	...	...	...	...	...	...	...
Epicanthus	...	...	...	...	...	...	...	...	...	...	...	...
MEASUREMENTS OF MEN IN MILLIMETRES												
Stature	1488	1567	1566	1487	1482	1486	1535	1600	1659	1509	1568	1549.7
Length of head	176	181.5	182	179.5	176	171	184	187	183	178	187	180.4
Breadth of head	135	145	137	141	136.5	140	135.5	145	146.5	135	137	139.4
Height of head	131	130	129	129	126	131	128	136	136	124	125	129.6
Length of face	109.5	107	115	110.5	102	102	97.5	110	104	97	114	106.0
Breadth of face	132.5	134.5	132.5	136.5	125	130	130	131.5	143	132.5	132	132.7
Bigonial breadth	98	101	101	99	95	103	101	99	114	107	107	102.3
Interocular breadth	32	35	36	33.5	34	31.5	34.5	37	34	33.3	33	34.0
Length of nose	48	48.5	54	44	41.5	39	44	42	43.5	40.5	45.5	45.5
Breadth of nose	41.5	46	41	43.5	35.5	36.5	41	42	40	45	36.5	40.8
Circumference of chest	700	788	826	803	766	774	784	815	926	799	873	805.0
INDICES.												
Cephalic index	71.0	79.9	75.3	78.2	71.9	81.9	73.6	77.5	78.1	75.8	73.3	76.0
Vertical index	74.4	71.6	70.9	71.9	71.6	76.6	69.5	72.2	74.3	69.6	66.8	71.9
Facial index	82.6	79.6	86.8	80.9	81.6	78.5	75.0	83.6	72.7	73.2	86.4	80.1
Nasal index	86.5	94.8	75.9	98.4	85.5	93.6	93.2	100.0	91.9	111.0	80.2	91.9



MANTRA OR BIDUANDA ABORIGINES, KENABOI VALLEY, NEGRI SEMBILAN.

C. B. K. 1000. 10-40



MANTRA OR BIDJINDA ABORIGINES KUNABOT VALLEY NIGRI SEMBILAN



MANTRA OR BIDUANDA ABORIGINES, KENABOI VALLEY, NEGRI SEMBILAN.

C. B. Kloss, Photo

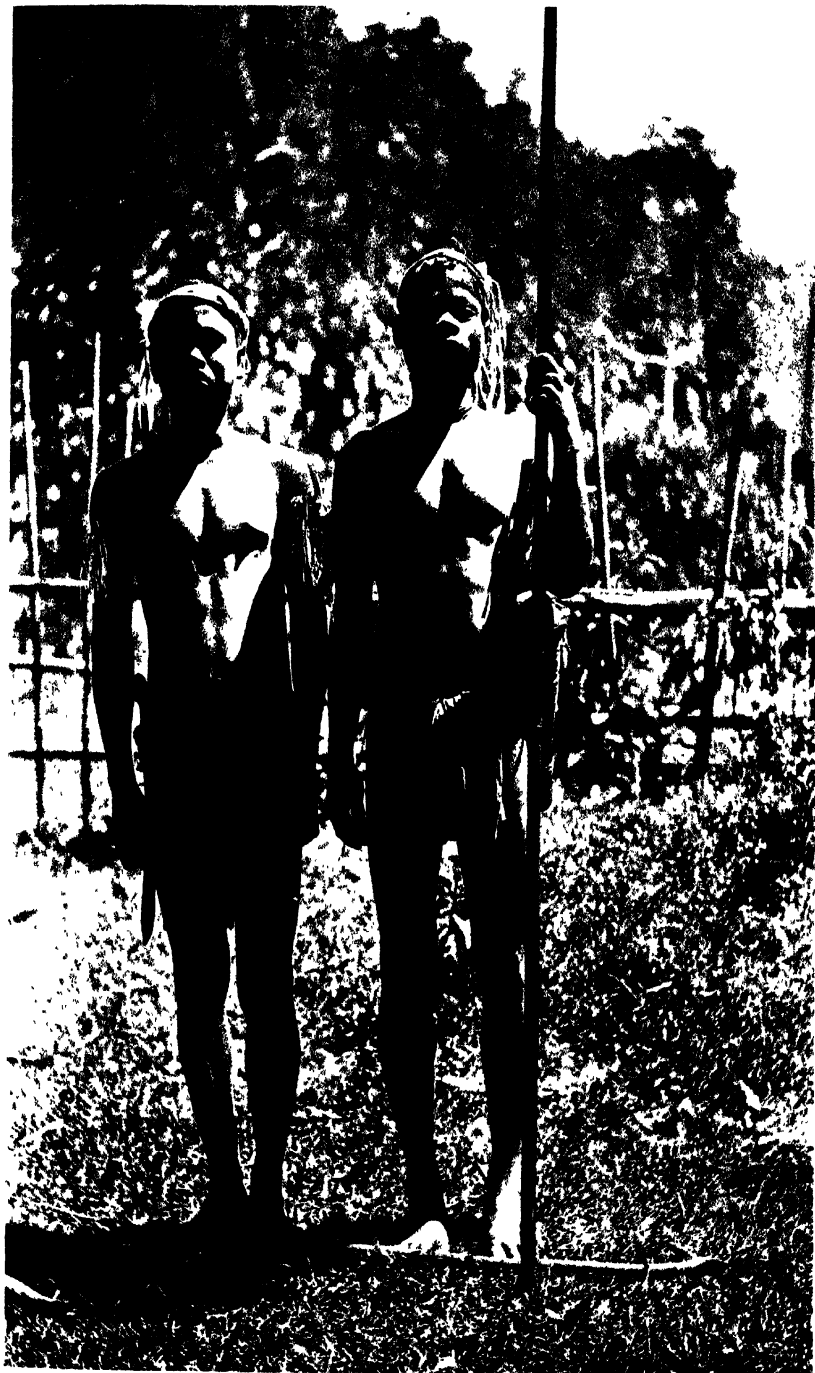


WANTRA OR BIDUANDA ABORIGINES, KENABOI VALLEY, NEGRI SEMBILAN.
C. H. Koo. Photo.



WANTRA OF BIDLANDA ABORIGINES, KENABOI VALLEY, NIGIRI SEMBILAN.

C. H. Kees, *Phot.*



C. B. Kloss, Photo

MANTRA OR BIDUANDA ABORIGINES, KENABOI VALLEY, NEGRI SEMBILAN.



MANTRA OR BIDJANDA ABORIGINES, KENAROI VALLEY, NEGERI SEMBILAN.

C. B. F. S. Photo



C. B. Kloss, Photo

MANTRA OR BIDUANDA ABORIGINES, KENABOI VALLEY, NEGRI SEMBILAN.



C. B. K. S. Photo.

MANTRA OR BIDUANDA ABORIGINES, KENABOI VALLEY, NEGRI SEMBILAN.



C. B. Kloss, Photo

MANTRA OR BIDUANDA ABORIGINES, KENABOI VALLEY, NEGRI SEMBILAN.



C. B. Kloss, Photo

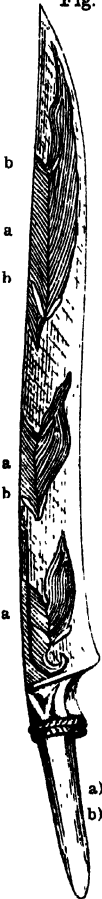
MANTRA OR BIDUANDA ABORIGINES, KENABOI VALLEY, NIGRI SEMBILAN.



Fig. 1



Fig. 2

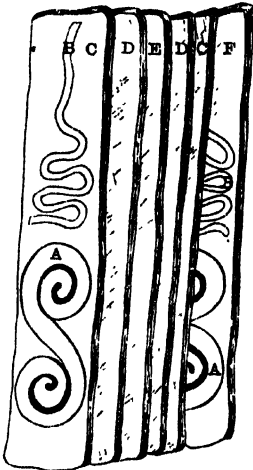


a) Damascene
b) Silver Inlay

Rough Sketch
of Badek Patani

Grooves cut with chisel

Besi Pamor



Rough Sketch
showing the building up of the spear head
from various pieces of metal

Rough Sketch
of Spear Blade showing different
Types of damascening

- A Besi Pamor
- B Besi Payong
- C Besi Kura
- D Besi Pedang
- E Besi Baja
- F Besi Rantai

NOTES ON THE MANUFACTURE OF DAMASCENED SPEAR AND KNIFE BLADES IN THE MALAY STATES.

BY I. H. EVANS, B.A.,

ASSISTANT CURATOR AND ETHNOGRAPHICAL ASSISTANT, F.M.S. MUSEUMS.

THE writer had recently the good fortune to come across a Malay kris-smith's forge. The art of damascening as applied to the blades of weapons is rapidly dying out in all parts of the Peninsula, and is virtually extinct in so far as the Federated Malay States are concerned; therefore, such facts as can still be gathered concerning an industry for which Malay craftsmen* of old were not unjustly celebrated should be put on record without delay. These notes consist entirely of personal observations, but those who wish to consult other papers should read the excellent account of kris making by Mr. R. O. Winstedt in the series of monographs on Malay subjects published by the Federated Malay States Government, and an article by Mr. W. Rosenhain in Vol. XXXI of the *Journal of the Anthropological Institute*, which deals largely with the microscopical aspect of the damascening as well as with the manufacture of blades. Both these communications are founded on notes taken by Mr. W. W. Skeat in Trengganu. There is also a paper by Mr. L. Wray in No. 3 of *Perak Museum Notes* "On the Malay Method of Colouring Kris and other Blades with Arsenic," which gives an account of the chemical combinations into which the arsenic enters with the different qualities of steel and iron of which Malay kris blades are composed.

It is interesting to note that in spite of the prohibition forbidding the wearing of weapons in public places, the Malay in many districts has not by any means conquered his passion for a handy weapon. The consequence of the ordinance merely is that instead of carrying a kris in his waist-sash, which from its very openness promotes good behaviour and politeness, he now wears a venomous little dagger, either *tumbuk lada*, *badak* or diminutive kris, concealed beneath his clothes. These small daggers were being turned out in numbers by the smith above mentioned and his brother.

The former, a young Patani† Malay named Awang, had set up his forge at Lenggong in Upper Perak, and in his company the writer spent several days in January, 1913, watching the processes

* Though Malay smiths of former days were undoubtedly skilled in kris-making, probably many of the very finest blades found in the Peninsula are of Javanese, Sumatran, or Bugis origin.

It is more than doubtful if any considerable manufacture of weapons was ever carried on in any of the West Coast States, though large numbers were turned out at Trengganu and to a less extent in Kelantan and Patani.—H.C.R.

† "Patani" as used in Upper Perak may connote anything coming from the Monthou Patani, known to Malays as the "*Tujuh buah negeri*," as the district is made up of seven small States. The Upper Perak Patani Malay is usually from Bantan or Legoh, not often from the small coastal district of Patani to which the name is nowadays confined.—H.C.R.

described below. Before giving an account of the method of manufacture of spear and knife blades some details of the tools used in the work may not be out of place, so as to give an idea of the very simple means by which quite complicated results are obtained. The smith's forge consists of a circular semi-open hearth of hard dried mud, built under a slight shed. On one side of this hearth is a horizontal box-bellows of Chinese type, which is about 5 feet long. The blast from the bellows passes through an iron pipe in the side of the box, the outlet of which is in the centre of the hearth a little below the level of the fire, there being a grating of iron rods covering the top of the short passage leading from the hearth centre to the entrance of the pipe in order to prevent either of these becoming choked by ashes. The fire, the fuel for which is charcoal, is protected by mud walls about $1\frac{1}{2}$ feet high, except at the front and back, the former being open and the latter closed by a small sheet of iron or an old changkul (native hoe) blade. The smith's tools and apparatus consist of a small anvil made from a block of iron set in the top of a large wooden post, a couple of pairs of roughly made but effective pincers, two hammers, one or two short cold chisels lashed at right angles with hide or rattan binding into a wooden haft about $2\frac{1}{2}$ feet long, the top of which is split to receive the iron, a set of files, a pump drill with a cord of bullock hide, and a small moveable vice, the last-named as well as the files being of foreign manufacture. Small gouges and chisels for cutting ornamental grooves in spear or kris blades are also used, but are generally made as occasion requires. In addition to these the smith has a small grindstone or emery wheel which is fitted on one side with a wood-covered spindle. When in use the wheel is pivoted between two upright posts and is worked by alternately pulling and releasing a cord which is wound round the spindle and attached to it at the end farthest from the stone. This operation is performed by an assistant and the blade being ground is only applied to the stone when its revolution is away from the grinder. The specimens of work which were obtained from the smith, and are now in the Perak Museum, consist of a knife, with < shaped damascening, of the type usually called *tumbuk lada* (the pepper crusher) but by the smith *badek Patani*, a damascened spear blade and a set of pieces illustrating the manufacture of the latter. In making the spear blade a number of pieces of iron and steel are cut and forged down until they form plates of roughly the following dimensions: length 105 mm., breadth 20 mm., thickness 3 mm. The piece selected to form the central layer of the spear is slightly thicker than the others and is of steel (*bési baja*), on either side of this are placed a plate of steel (*bési pedang*) made from an old scythe blade, and outside each of these again a plate of *bési kurai*, iron or steel of unknown composition, which the smith said he obtained from the Patani States. There are also two other plates, one on each side, composed of old Government elephant chain (*bési rantai*), but these only form a guard over

the damascening (*pamur*) during welding. To make the *pamur* for the particular pattern of spear chosen for the Museum, two pieces of old umbrella-rib were taken and worked into the shape shown in Pl. XIV; next two stripes of *b'si pamur* (soft wrought iron?), also obtained from Patani, were bent into scrolls (Pl. XIV) and hammered flat. These four pieces of metal form the *pamur*, being placed, one of each kind, outside the two plates of *b'si kurai*, with the *b'si payong* nearest the end which is to form the point of the spear. The plates of *b'si rantai* are added outside these and the whole "sandwich" is taken and carefully heated and then dipped in a mixture of sand and water to which has been added a pinch or two of iron flakes taken from below the anvil. When the pieces have been thoroughly covered with sand they are grasped with the pincers and again placed in the fire, which has some little time previously been sprinkled with the wet sand: the sand according to the smith acts as a flux (*p'tiri*). They are next taken from the fire, beaten on the anvil, re-dipped in the sand, heated and beaten until all the layers have been welded together. The block thus formed is then further dipped, heated, and beaten on all its faces until no crevices are left, losing in the process a considerable amount of weight through scaling. When the welding has been completed to the smith's satisfaction, he takes the block and forges it out into the required shape of the spear head. Next, he slightly files the blade and rubs it with a mixture of lime juice, sulphur, and salt, in order to bring up any *pamur* which may be visible owing to the scaling away of the guard plates of *b'si rantai*. He is thus able to judge to what extent he can file up the blade without injuring the damascene. When the filing process has been completed, two ornamental grooves are cut on each side of the blade near its base, and the round ornaments below the base filed into shape. Next, the blade is heated and dipped into a mixture of buffalo fat, turtle fat and coconut oil to temper it. Then it is wiped dry and ground on the emery wheel until sufficiently polished. At this stage the damascening is invisible, or nearly so, and the blade requires to undergo a pickling and developing process in order to bring it out. With this object it is placed in a bamboo containing a mixture of lime juice, coconut milk, a little of the water used for washing rice, which has been collected from the pool of slops which is found below all Malay houses, pineapple leaves, saltpetre, pieces of *Lingkuas** stem and *Gamas* leaves (?). The blade is left in this mixture for a couple of nights or so, until the smith considers that the pickling or etching process is sufficiently advanced. He then cleans it in preparation for the treatment which is finally to bring up the damascening. For this he takes a small piece of red arsenic, such as is generally sold in the bazaars, half a lime, and a little juice expressed from a piece of *Lengkuas* stem. He spreads his mat in the open, and grasping the spear head in his

* *Lengkuas* is, according to Wilkinson, either *Alpinia conchigera* or *Alpinia palanga*.

left hand exposes one face to the full light of the sun, meanwhile rubbing it lightly with the arsenic and lime juice, etc. The damascening up to this time has been very slightly visible, but after a few minutes treatment with these materials comes into view quite clearly, much as the picture becomes visible on a photographic plate when immersed in the developer. The other face of the blade is then treated in the same way and the spear head is complete.

THE USE OF THE TERMS PAMUR AND DAMASCENE.

The term *pamur*, as used by the Malays, is not synonymous with the English word damascening. The *pamur* of a blade, strictly speaking, consists only of small ornamental pieces of metal-work applied to those surfaces of the welded block which are to become the faces of the blade. The wavy pattern along the sides of the kris or spear blade, which arises from the hammering out of the welded plates in such a way that the centre plate projects furthest at the edges and the two outer plates least, so that the edges of the plates appear in regular gradation, is by the Malays termed *kurai*. Thus in the spear-head described above only the pieces of *běsi payong* and *běsi pamur* form the *pamur*, while the edges of the *běsi baja*, *běsi pčdang*, and *běsi kurai* make up the *kurai*.

MAKING THE BADEK PATANI.

In manufacturing the blade of this knife the smith first took two rods, one of *běsi kurai* and the other of *běsi baja* (steel) and welded them into a single bar. This when complete had a length of about one foot and a cross section roughly of half an inch by a quarter of an inch.

The bar was then heated in the fire, seized with two pairs of pincers and given a strong right spiral twist along one-half of its length, several re-heatings being necessary before the process was complete. The other half of the bar was similarly treated, except that instead of a right it was given a left spiral twist. The portions twisted to the right and left thus met in the centre of the bar. Next, the broader sides of the bar were beaten with a hammer until the twist on them was flattened down, and then the whole bar was bent in the centre to form a U. The U was further heated and beaten until the limbs came to lie together and had become fused. Then a piece of steel corresponding in length to a single limb of the U—that is to say, about 6 inches or 7 inches long and $\frac{3}{4}$ inch thick, was welded to the outer side of the U limb with the left spiral. This piece of steel becomes the edge of the knife, the limb with the left spiral the lower portion of the V-shaped damascening, and that with the right spiral forms the upper part of the damascene and the back of the blade. The three portions are forged into one solid block and, when complete fusion has taken place, are further hammered till they attain the shape of blade required. The methods of welding, polishing and bringing up the damascene are the same as those used

for the spear head. The blade when thus completed has a plain undamascened edge, but the back on either side is composed of alternate V-shaped bands of lighter and darker metal, the damascening being further accentuated by the outer edges of the darker metal V's being inlaid with small stripes of silver. The inlay is effected by cutting a groove in the iron with a small cold chisel and laying in a shred of silver; the edges of the cut left by the chisel are then hammered down until the silver is firmly gripped by them.

THE SMITH'S CHARMS.

As in the case of most of the callings followed by Malays that of a kris-smith can boast its own peculiar set of formulae devoted to invoking the particular spirits whom the smith looks upon as the guardian genii of his trade. The two specimens given below are used in the welding of iron, but the smith also recites them at the monthly "smith's promise" (*Jangi tukang*) which is sometimes called *Jemuan hantu* or the feeding of the spirits. Behind the smith's forge is a funnel-shaped cup, made from a rolled leaf planted in the ground; this is for holding a small offering such as an egg or a little coconut oil. It is in and around this cup that the monthly offering is placed.

THE INVOCATIONS.

(1) *Bismillahi'r rahmani' r-rahimi. As'salam alaikum, Tabek Pandai Kuma, Pandai Bakar, Gura yang hormat Gura yang harkat, walfat Inna A-athaina, kul kat.*

(2) *As'salamu alaikum, Hantu Tanah Jëmbalang Bumi, Jin Hitam sa-gema api, mari makan jamuan aku. Jin Pnteh, Nur Muhammad, di-dëngar ëngkau pësan aku, ëngkan ta'-dëngar pësan aku, aku sumpah, bumi sa-tapak tiada mënanggong, ayer sa-titek tiada bërjumpa, jikalau ta'-lëkat ëngkau tolong pëlëkatkan.*

These may be roughly translated as follows:

(1) In the name of God the Merciful, the Compassionate, Greetings to ye, Greeting, O Smith, Master of the Hammer, Master of the Forge, Reverenced Teacher, Famous Instructor—(Debased Arabic, probably some form of greeting).

(2) Greeting to you O Spirits of the Earth and of the World and to you Black Spirit, Flame of Fire; come eat the feast I have prepared you. Hear my commands, O White Spirits, Parrots of Mohammad. If you hear them not I curse you, may no sod of earth support your feet, no drop of water quench your thirst. If the (iron) welds not, help its welding.

These invocations, as is the case in almost all Malay spells or charms, present a curious mixture of Mohammedanism and spirit or nature worship; in many cases a leavening of Hinduism is further added.

NOTES ON THE ABORIGINES OF LENGGONG AND KUALA KENERING, UPPER PERAK.

By I. H. EVANS, B.A.,

ASSISTANT CURATOR AND ETHNOGRAPHICAL ASSISTANT, F.M.S. MUSEUMS.

THOUGH on linguistic grounds the aborigines of Lenggon are placed by Skeat among the Northern Sakai, ethnologically there can be little doubt that Negrito blood preponderates enormously over any other. That there is, however, some slight Sakai element among them seems most probable. They describe themselves as being considerably lighter in colour than the pure Semang of Grit, who also speak a Sakai dialect with a few interspersed words of Semang origin. Skeat does full justice to the Negrito origin of the Lenggon people and attributes their language to encroachment of Sakai dialects upon Semang.

The writer spent some three weeks in Upper Perak in January, 1913, with the view of getting into touch with these interesting people. Two encampments were visited, one on a hill close above Lenggon, the other about a mile and a half from Kampong Gelok, which place is situated some two and a half miles from Lenggon on the Grit (or Gris) road.

A wandering anthropologist being to the native mind a person without any ostensible business except that of poking his nose into all kinds of ungodly matters which should not concern him, and being armed moreover with a battery of mysterious and fearsome instruments, such as callipers and measuring rods, is liable, move he never so carefully, to be suspected of ulterior designs upon the people he is attempting to study.

In spite of these drawbacks the expedition was not altogether a failure, either with regard to aboriginal or Malay investigations.

HABITATIONS AND INHABITANTS.

The Lenggon settlement and that near K. Gelok differed considerably in the type of dwelling in use. At Lenggon the Negritos were living in a number of huts made of tepus leaves lashed to a light framework of saplings. The essential plan of a hut was that of two wind-shelters set opposite to each other and arching over slightly so as to meet at the top. Sometimes, however, a whole arch frame was made from a single piece of wood. In several instances, in order to afford greater protection, one end of the hut was shut up by a frame of sticks covered with palm leaves. Each hut had its own fireplace and also a sleeping platform of bamboos over a framework of sticks, which was raised about a foot from the ground. As far as the writer could ascertain separate huts were assigned to married couples, bachelors, and unmarried girls.

The Gelok encampment consisted of three shelters so arranged as to enclose an oval piece of ground some 25 feet by 15 feet. The shelters, though leaning towards one another at a considerable angle from the perpendicular, did not meet in the middle and left a space about 6 feet wide open down the centre. One side of the hut was occupied by the women and children and the other by the young men, the ends being reserved respectively for, Toh Singha the headman of the camp and a married couple. Altogether, there were 13 people in the camp—one old man, one middle-aged man, three youths, one small boy, one baby (male), one very old woman, one middle-aged woman, one young married woman, one girl of about 15, and two small girls. The Negrito settlement at Ayer Balik was not visited. The Lenggong camp was said to have been in use for more than two months. A fire of logs placed radially was burning in every shelter in both the encampments.

TRIBAL NAME AND ORGANIZATION.

The writer had great difficulty in obtaining the correct name of the tribe, one man, Sapi or Goh, informed him that the correct style was Semang. On the other hand, Dahabok, the headman of the Lenggong encampment, vigorously denied this and said that his people should be called Sakai Jeram (Sakai of the rapids). The latter of these names at any rate is purely Malay. It seemed impossible to ascertain the name used by the Negritos themselves, but subsequently the writer obtained information from the aborigines of Ijok in Selama, with whom several Lenggong men were living, that the correct name for these people in the Lenggong dialect was "*Semark blum*," "*People of the big water*" (semark=men, blum=big). The Ijok people called themselves "*Menik gul*," "*People of the marsh or coast lands*" (menik in the Ijok dialect=men). Many of the aboriginal tribes of the Peninsula dislike the use of the names Sakai or Semang, which are often used by Malays as terms of ridicule or opprobrium. Tamil coolies, who from their long hair and habit of wearing a loin-cloth are objects of derision to the Malay, are sometimes dubbed *Sakai pekan* or town Sakai. Not infrequently a Malay will openly express his doubts as to whether the aboriginal is a human being at all.

The aborigines knowing all this—and being very sensitive about it—consider the term Sakai, which is used by the Malays to describe most of the jungle tribes, abusive and prefer to be called by some other name to which no stigma is attached, such as Orang Bukit (Hill men), Orang Laut (Men of the sea), or Orang Sabat* (said to mean friendly people).

Possibly the difficulty experienced at Lenggong in obtaining the name of the tribe (as used by the Malays) was due to some such cause, though the Malays themselves seemed uncertain as to the correct designation which should be applied. The idea that the

* Or *Sahabat*.—H.C.R.

term Semang indicates a race with woolly hair and a black skin seems to have obtained a hold on several of the Negritos of Lenggong, and giving these features as characteristics they tried to make it plain that they had nothing to do with any such people, one man saying that the Semang lived at Ijok, another that they were the aborigines of Grit, and the third that they were the hill tribes who live across the Perak river. It would, however, perhaps be difficult to find people in the Peninsula with more woolly hair than some of the individuals seen at Lenggong, while the skin colour too was often extremely dark.

Tribal organization appears to be but slightly developed. An elderly man is the acknowledged head of every encampment and he is to a certain extent recognized by the local Malays as chief of the aborigines. A high sounding title, such as Penglima or Datoh, is sometimes conferred on him in jest and of this he is generally inordinately proud.

PHYSICAL FEATURES AND MEASUREMENTS.

The average colour of the people was a dusky chocolate, the women being as a rule rather lighter than the men. Almost every individual was filthily dirty, water for bathing purposes seeming to be at a discount. For this reason the real skin colour is probably a great many shades lighter than it appears to be; in a few cases the skin over the cheek-bones which had in some manner been wiped more or less clean showed up as a rich red brown. In addition to their dirty condition about one-half the total population were badly afflicted with "Kurap," a very unpleasant skin disease of fungoid origin (*Tinea circinata*), and a few individuals were suffering from a form of indurated ulcer. In about 70 per cent. of the males the hair could be described as being of the true pepper-corn type, while in almost 20 per cent. it was as straight as in Malays. The rareness of intermediate types was very noticeable. None of the men wore their hair more than three inches long, and the majority had it a great deal shorter. The women's heads were close shaven with the exception of a single tuft in the median line at the back. This tuft seemed to be about 9 inches to 1 foot long and the hair looked harsh and frizzly. In many cases, both in men and women, the hair had a distinctly rust red tinge. With regard to facial characteristics, the forehead was generally low and rounded, the nose low at bridge and root, the nostrils broad and depressed. The eyes were placed fairly wide apart, but were rather narrow. No trace of Mongolian fold was observable. The lips were usually rather thick than thin, but not abnormally so; slight prognathism was common, and in a few cases the lower jaw-bone was prominent and heavy at its angle.

On the exceedingly small number of measurements taken it would be unwise to attempt any kind of generalization. The writer

therefore contents himself with merely giving the results obtained and pointing out that the cephalic indices of the individual ranged from brachycephaly to mesaticephaly. All persons measured were adult males.

MEASUREMENTS IN MILLIMETRES.

Serial No. of individual.	Name.	Height.	Head length.	Head breadth	Cephalic index.
1 ...	...	1497	186	145	77.9
2 ...	...	1522	178	141	78.5
3 ..	Keladi	1480	183	146	79.7
4 ...	Puchok	1394	185	145	78.3
5 ...	Goh	1583	177	148	83.6
6 ...	Goh	1429	178	140	78.6
7 ...	Dahabok	1497	186	145	77.9
8 ..	Chalah	...	176	141	80.1

CHARACTER.

Continuous intercourse with both Malays and Chinese has had anything but a happy effect on the aborigines of Lenggong. While still retaining much of the timidity of jungle men, they have substituted for their primitive good qualities, lying, deceitfulness and rapacity. Some few have been further demoralized by the vice of opium smoking, with which it is probable that some Chinaman or Malay has infected them of set purpose in order that they might become permanently attached to him owing to their craving for the drug. In spite of their faults they seem to be, when in their own encampments, a merry and cheerful little people.

DRESS AND ADORNMENT.

In visiting the Negrito encampments the thing which perhaps struck the writer most was the people's great love of dressing up and their fondness for using flowers for this purpose. The young bloods seemed to do little else in their spare time and many of them had decorated their heads with wreaths of purple and white everlasting flowers (Malay, Bunga tiga bulan) which were threaded on the stalks of some fibrous plant; head-dresses of yellow blossoms were also in favour, and one boy had on a fillet of green pandanus leaf decorated with yellow flowers at the top. Other men wore head-bands of Akar batu, a fungus rhizomorph which is very generally believed by the aborigines of the Peninsula to be a charm against *hujan panas* (lit. hot rain), "April showers." At such times the evil spirits of the air are, according to native legendry, said to have power of bringing disaster to mortals. Fever is much dreaded by both Sakai and Semang and is often said to be the result of "*hujan panas*." Three youths in the Lenggong encampment were wearing thick bands of twisted grass around their foreheads, tied at the back

so as to leave a long tail hanging down behind. Two Jew-harps of bamboo were attached to one of these wreaths and depended down the side of the owner's face. Bracelets of *akar batu* were very generally used by the men and necklaces of the same material were also common. Two women had bamboo combs stuck in the lock of hair mentioned above, these had the true Negrito type of decoration—that is to say, much of the ornamentation was produced by cutting away the white outer skin of the bamboo to form the background and leaving the patterns standing out slightly in relief. This background is rubbed with *damar kelulut* (a resin used by a small species of bee to make its nest) to give it a rich brown appearance, and the white skin of the patterns shows up clearly against it. Sometimes this process is reversed and the bamboo skin removed to form the patterns, the background remaining untouched. In typical Sakai ornamentation neither of these two methods are employed; the designs are always merely scratched in and coloured. Negrito tribes frequently use scratched-in patterns, but on a finished article there are generally to be found several bands in which the patterns have been produced by removing the outer skin of the bamboo worn in the jungle. The men were all wearing loin-cloths of calico or other European material and the women either sarongs of Malay type girt beneath the breasts or short skirts of *akar batu*, sometimes, however, both of these were used in conjunction.

WEAPONS

The only weapons seen were the blow-pipe and the spear, the former was generally without decoration on its outer tube and had the spherical mouthpiece, typical of Upper Perak, either of wood or gettah. The inner tube was, in the majority of cases, made of two pieces of bamboo placed end to end and joined by a short covering section of the same material. The Negritos said that they made the two-jointed tubes themselves but that they could not get bamboo internodes long enough to make a single-piece tube, and that sumpitans of this variety were purchased from the Orang Bukit (Sakai of the hill regions beyond the Perak river). All the quivers examined were typically Negrito—that is to say, they were made from a single internode of bamboo without cover of any kind, were stoppered with a plug of leaves and were carried mouth upwards in the loin-cloth. The designs on them were produced by the same method as that used for the combs. Some idea of these may be gained from the accompanying rough sketches (Pl. XV). The use of the comb patterns as charms is dealt with under another heading. The darts were all nicked about $1\frac{1}{2}$ inches from the point in order that when an animal is wounded the rest of the dart may break off and leave the poisoned end in the wound. The head of the dart below the nick is slightly thickened. In a quiver which contains both poisoned and unpoisoned darts, as well as small spatulae covered with Ipoh poison, the poisoned darts are marked on

the tops of the heads with two dots in order to distinguish them from the others. One of the men informed the writer that Ipoh juice was the only ingredient used in the poison, and warned him against handling spatulae covered with fresh poison, saying that they would set up irritation of the skin. In order to try the effect of the poison on a hen—a bird which according to the Ulu Langat aborigines is immune to its effects—one was brought and tethered to a peg on an open piece of ground. A Semang then retired to a distance and placing a dart and wad of vegetable fluff in his blow-pipe squatted down on his haunches and grasped the blowpipe with both hands close above the mouthpiece. When he discharged the dart the mouthpiece was half taken into the mouth, so that the lips, especially the top one, projected over it. The wad left the pipe with considerable force and fell some yards away on the shooter's right: the dart struck the hen in the muscles at the back of the neck on the right side. At first, except for a slight flapping of the wings, the bird, when struck, seemed scarcely to take any notice of the wound, but after a few minutes it began to look decidedly "roopy" and squatted down with feathers puffed out. It remained in this condition for about a quarter of an hour and then seemed to recover, for it began to peck about in the sand in search of food. The Semang up till this time had kept on saying that it was dying, but on its recovery they seemed astonished and remarked that a monkey when wounded with one of their darts died almost instantaneously. As the fowl showed no signs of dying, after a wait of about half an hour it was handed over to the Negritos for their supper. The bow, according to the Negritos account, though well known among them, was no longer used. They offered, however, to make one to demonstrate their knowledge of it.

MUSICAL INSTRUMENTS

The only musical instruments observed, other than the Jew's-harps mentioned above, were bamboo flutes and a large pair of stampers of the same material. The latter were very large and gave out quite a musical sound when struck on the ground. The Jew's-harp was played by means of a cord, with a small transverse wooden handle, attached to one end of the instrument just above the base of its tongue. By holding the "harp" between the lips with the teeth kept slightly apart, and by jerking the string some not unpleasant vibrating notes can be produced. The Negritos seem to have a strongly developed taste for music, and when walking in single file through the jungle the writer has heard them keeping up a continuous rising and falling chant of considerable sweetness.

OTHER MANUFACTURES

Loosely woven carrying baskets of rattan were common in both the encampments visited. A small conical fish trap of the kind known to the Malays as *Tengkulak anak* was found lying in the camp

above Lenggong, after it had been deserted, and also a ceremonial decoration of plaited leaves representing a kris. Pandanus baskets of various sizes for holding pinang or sireh were much used by most of the men. The old headman of the camp at Lenggong had a small bamboo box containing python fat which he said was a valuable remedy for disease.

FOOD.

Rice eked out with a little fish, game or vegetables, besides jungle fruits and various kinds of tubers, seem to form a large proportion of the Negritos' food. The rice, according to their own account, is partly grown by themselves at their encampment at Ayer Balik near Kuala Kenering. Tubers of a wild plant called *ubi kapor* are shredded previous to cooking on a piece of a rattan to which the thorn bases are left adhering. In the encampments Malay or Chinese cooking pots are used, though on journeys it is probable that they often cook in bamboo internodes, as is done by many of the aboriginal tribes. A tortoise-shell and the bones of numbers of small mammals and birds were found in the hearths of recently used rock-shelters near the limestone caves above Lenggong.

PATTERNS ON DART QUIVERS.

The method by which the Negritos produce the ornamentation on their utensils has been dealt with above, while a few remarks on the magical use of the patterns will be found under the section entitled Religion and Magic. The rough sketches of quiver patterns on Pl. XV. were made both at Lenggong and Kuala Kenering. As might be expected, all the designs are derived from objects well known to the Negritos, many of them being representations of animals, fruits, etc., which are used as food.

I and II. Two sets of patterns from one dart-quiver which have an intervening blank space between them. I, at top, II reaches to within $1\frac{1}{2}$ inches of base.

III. A block of patterns repeated four times on a quiver, with blank spaces of equal size between each block.

IV and V. Two small panels of pattern selected from among others similar to those illustrated.

VI and VII. Selection of designs from a quiver entirely covered with ornamentation. VI, patterns at top of quiver. VII, a variant of the lotong pattern found lower down on the quiver. The rest of the designs were repetitions of those shown in VI.

Note.—All heavily blackened portions, whether of pattern or back-ground, represent places where the outer skin of the bamboo has been removed and the underlying tissues darkened with *damar kelulut*, as described above. Some patterns, such as "a," are produced by merely scratching in the design and colouring it.

PATTERN NAMES IN MALAY AND ENGLISH

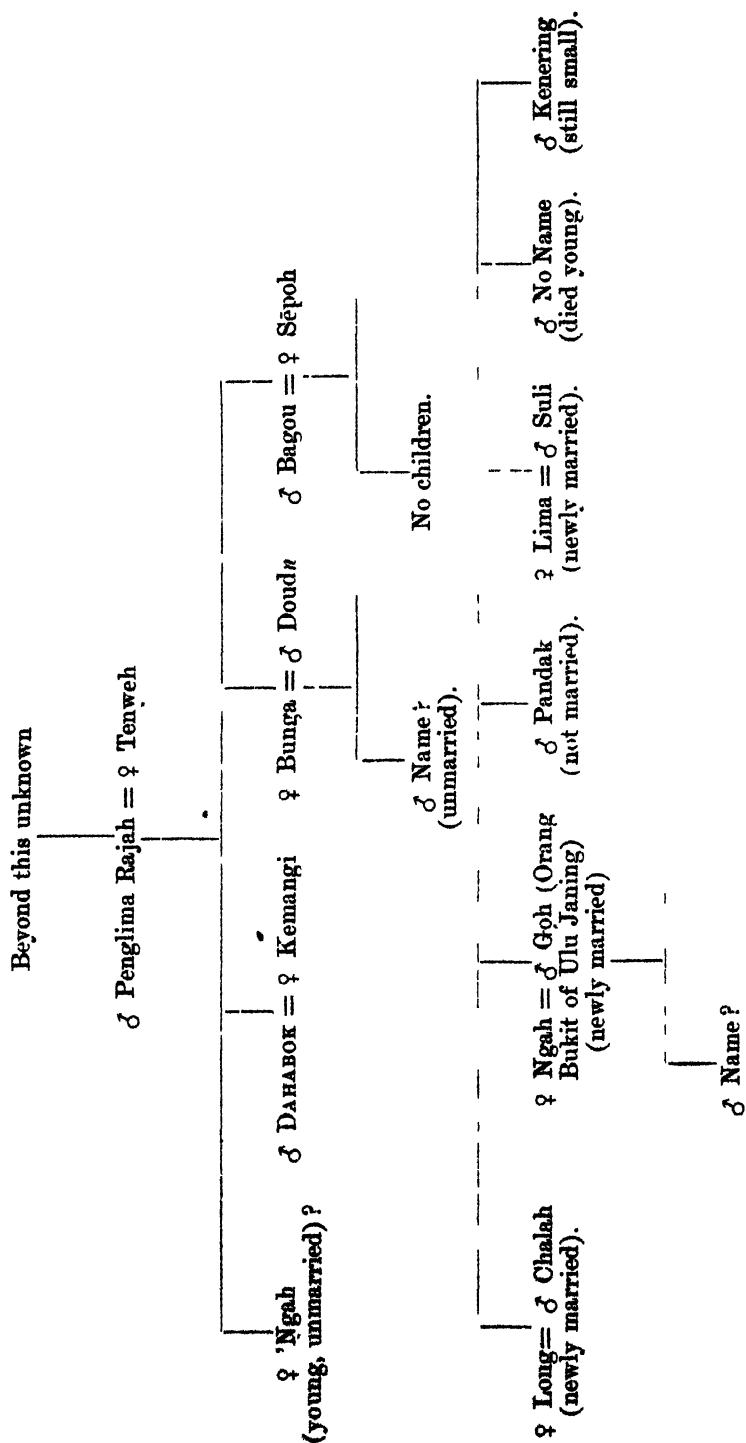
(a) Gelang	Bracelets	
(b) Buah padi	Padi fruit,	
(c) Lengan Lotong	Arms of the Lotong monkey	
(d) Mata Lotong	Eyes of the Lotong monkey	
(e) Batang	Tice trunks	
(f) Choban	Fishing line winders or netting needles	
(g) Mata Lotong or Buzong Kuang	Eyes of the Lotong monkey or the Aegus pheasant	Two names given by dif- ferent men to the same pattern
(h) Gigi Lotong	Teeth of the Lotong monkey	
(i) Lotong	The Lotong monkey	
(j) Bunga timon	Cucumber flowers	
(l) Biji timon	seeds	

PERSONAL NAMES AND PEDIGREE

A list of personal names is given below and from these it appears that place names, flowers, animals, with Malay words signifying eldest born (Sulung), middle born (Nengah), and last born (Bongsu) are all used as proper names. In the case of the man named Sapi, he was given this style owing to his having been born at Bukit Sapi (Wild Ox Hill), a place inhabited by a section of the Negritos, but he had also mother name Goh. The latter name was obtained from old Dalabok, the head of the Iban camp. It was impossible to obtain any names from him further back than those of his mother and father and he even could doubt about his own children's names until they were called to him by his daughter.

Name	Meaning	Sex
Sapi (M) or ...	Wild ox	Male
Goh	"	"
Keneung	Born at K. Keneung	Male
Bunga (M)	Flower	Female
Dalabok	"	Male
Loug (Sulung) (M)	Eldest born	Female
Ngah (M)	Second	"
Lima (M)	Five	"
Pandak (M)	Short (a name usually given by Malays to the 5th or 6th child)	Male
Kemangi (M)	A tree (<i>Cinnamomum parthenorylon</i>)	Female
Suh	?	Male
Tenwoh	?	Female

PEDIGREE.



Name.			Meaning.			Sex.
Sepoh	...	...	?	...	...	Female
Bagou	...	...	?	...	...	Male
Keladi	...	...	Yam	...	...	"
Douda	...	...	?	...	...	"
Chalah (M?)	..	..	?	...	...	"
Puchok	...	...	A sprout (of a tree)			"

The letter M after a name signifies that the word is Malay.

RELIGION, MAGIC, ETC.

Questions concerning religion were productive of negative answers, but a little information was obtained with regard to the significance of the Lotong monkey (Presbytes) pattern which is so constantly found on the dart quivers. This was said to aid hunters in their quest for monkeys; and probably the same kind of idea attaches to the argus pheasant design which is by no means uncommonly used (*see* Pl. XV).

A most interesting object was bought from a Negrito* at the Lenggong camp; this was small raceme of dried flowers which were said to be those of the *chenduai* plant, so famous among the Malays as a love-charm. It is mentioned in Malay romances as growing only in the most inaccessible fastnesses of the mountains, while it is said that a drop of coconut oil, in which a flower has been steeped with the recitation of appropriate formulæ, will, if placed on the skin or clothing of a woman, make her fall madly in love with the possessor of the charm. The writer has recently seen similar flowers in the possession of his Malay servant and was informed by him that they were obtained from the aborigines of the Ulu Langat. The specimen from Lenggong was forwarded to Kew to be named and has been identified as *Salomonina aphylla* (Griff); several tufts of the same or a related species have recently been found growing on Gunong Kerbau.

* The people of most of the aboriginal tribes of the Peninsula are credited by the Malays with supernatural powers and skill in love-charms.

NOTES ON THE ABORIGINES OF THE ULU LANGAT AND KENABOI DISTRICTS OF SELANGOR AND JELEBU.

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THE following ethnographical notes were made in July and August, 1912, during a fifteen days' expedition to the borders of Selangor and Jelebu. The starting point of the trip was Dusun Tua in the Ulu Langat district of Selangor, while the route taken was up the Langat river from the 19th milestone on the high road. On leaving the Langat its affluent the Pilas was followed for some little distance; then the divide, Bukit Chanchang Sebarau, lying between Gunong Itam and Gunong Hantu, climbed, and the descent made to the Kenaboi river by way of its tributary the Sungai Kring. The valley of the Kenaboi was followed down to the rest-house at Kongkoi, and from that place a three days' expedition was made to a Sakai kampong not far from the Kenaboi Hydraulic Mine. Dusuns (orchards) and other signs of Sakai occupation were extremely frequent up the Langat river and as far as the foot of the divide, and altogether three villages were passed through. Settlements of the aborigines on the Kenaboi side seem to be much less frequent and only a single village was met with in the extreme "ulu" (upper watershed). One kampong, of which all the inhabitants had gone out to work, was situated some seven or eight miles above Kongkoi, while a small party of men and women were met in the jungle on the same day.

The trip from Dusun Tua to Kongkoi occupied altogether eight days, but two were practically wasted owing to the late arrival and insufficient numbers of the Sakai coolies on the first day and the time taken in getting more men on the second. Coolies were difficult to obtain owing to the durian season being at its height..

ORIGIN OF THE PEOPLE OF THE LANGAT AND KENABOI VALLEYS.

The Sakai who live near the 24th milestone, Dusun Tua, who were my coolies as far as Kongkoi, informed me that the people of the Ulu Langat and the Ulu Kenaboi were all of one race, and this fact was confirmed by the people of the village near Kenaboi Hydraulic Mine, who recognized the names of the Dusun Tua men and told me that they were related to many of them by blood or marriage. The three vocabularies made out, as below, one in the Ulu Langat, one in the extreme Ulu Kenaboi, and one near the Hydraulic Mine seem to afford proof of the same thing. The Langat Sakai acknowledge the names of Blandas, Orang Bukit or Sakai Tanjong, but seem to have a preference for the latter. The legends concerning the origin of the peoples which were obtained on either

side of the divide would appear to indicate a race mixture. The Dusun Tua men had a story that they had been driven up into the hills by Rawa and Mendiling Malays, by whom they had always been ill treated, but to whose oppression the final touches were put owing to the Sakais obtaining a magnificent pair of elephant tusks. The greed of the Rawa and Mendiling warriors being aroused on hearing of this acquisition they tried to force the Sakai to give the tusks up. The latter however replied that they intended to give them to the Toh Klana of Sungei Ujong, whom they regarded as their chief. The Rawa and Mendiling people thereupon declared that if they were not given up they would make war both upon the Sakai and the Toh Klana. In the fight which ensued the Sakais got much the worst of it and ran away to the hills, where they have remained ever since. The story obtained from the settlement near the Kenaboi Mine was somewhat different. It was as follows: "Our people came over from Pahang owing to trouble with the Malays. When we arrived here there were only a few Sakai in the country. These were the true Orang Bukit (hill people). They had been very much reduced in numbers by the Malays, who killed them and stole their children to sell as slaves. With this remainder of the Orang Bukit we intermarried. There are now only two or three people of pure Orang Bukit blood left." One youth, 16 or 17 years of age, was pointed out as having an Orang Bukit mother, but there were said to be no full bloods in the village at the time. Orang Bukit is the term generally applied by the Malays of the Peninsula to all aborigines who live in hilly districts. A legend was obtained from Dusun Tua Sakai that their forefathers had come from Menangkaban to Johore, crossing the sea on a banana plant trunk (batang pisang).

TRIBAL ORGANIZATION.

The head of each section of the Blandas is the Batin, who is helped by various sub-officers. The Batinship in the Ulu Kenaboi is said to be at present in abeyance. The following is a list of the four chief officers which I obtained from the Batin of the people at the 24th mile, Dusun Tua:

(1) Batin	(3) Jukrah
(2) Jinang	(4) Penglima Garang

The Batin is the supreme authority and from his decision there is no appeal. When a case with which he is not able to deal is brought before a subordinate officer he turns it over to the officer next above him, and he may pass it on again until it reaches the Batin.

The Penghulu Balei is a subordinate officer who presides at feasts.

There are also said to be a Penghulu Muda, whose duties do not seem to be well defined; and a Penghulu Dagang, who looks after strangers.

The Pawangs or medicine men, called by these people Poyangs, may perhaps also be classed as tribal officers. Their duties are doctoring sick persons, taking the "semangat padi" (rice soul) among the people who plant wet padi, and performing various shamanistic rites.

Among the Ulu Langat people the Batin regalia are said to consist of a kris and a silk head-cloth.

The Langat Batinship descends in the female line—i.e., to the son of the Batin's eldest sister.

TYPES OF HOUSES AND SHELTERS.

The permanent dwellings observed were of two forms, one raised from the ground on posts and having a central roof-beam with an atap roof sloping away from it on either side so that it resembles the ordinary Malay type of house in its exterior, the other slightly, if at all, raised from the ground, with a plain sloping type of roof lacking any central roof-beam. Temporary shelters were of three kinds, the first a structure with a sloping roof resembling that of the simpler type of house; the second a beehive-shaped hut made of bertam or other large leaves, the proximal ends of the leaf petioles being planted in the ground. A small circular opening which serves as a doorway is left in one side of the beehive, and this has to be entered on hands and knees or in a stooping position. The third type of temporary shelter is the wind or rain screen, consisting of large leaves planted with the bases of the petioles in the ground which often lean at a slight angle from the perpendicular so as to afford better protection to the occupants. The ground plan of a shelter of this kind may be either a straight line or a semicircle. Huts of this third variety are never used for more than a night or so, but those of the two other types appear occasionally to become temporarily permanent.

MEDICINE HUTS.

A very fine example of the Pawang's medicine hut was seen in the jungle in the Ulu Langat. It consisted of a beehive hut of bertam leaves with a crawl-in entrance, erected on a bamboo platform so as to leave a small verandah in front. On this verandah were lying several bamboo stampers. Inside the hut, which had been abandoned, was suspended a tray of plaited bamboo decorated with hangings of fibre and bands of pandan leaf decorations called "*tagak*"* or "*jari lipan*," bunches of "*dauu lebar*" (? lit., broad leaves) and plaited ornaments known as *subang* (ear-rings). On the floor was a grass whisk which the Pawang holds in his right hand and swishes backwards and forwards when calling the spirits. The Sakai coolies remarked that only a big Pawang would have his hut so far from the village. Subsequently, other Pawangs' huts were seen both in the Ulu Langat and also near the Kenaboi Mine, but in these cases

* Probably *tajok* to which Wilkinson assigns the meaning "cigarette."

an incomplete bee-hive of bertam leaves had been erected within an ordinary hut of the village. The decorations in these bee-hives were of the same type as those seen in the jungle.

AGRICULTURE.

The aborigines around Dusun Tua and also near Kongkoi cultivate wet padi and, as mentioned above, perform the "semangat padi ceremonies"; the people of the extreme "ulus," both of the Langat and Kenaboi, have their clearings planted with kaladi, keledak, ubi kayu and a little Indian corn. Tobacco is also grown in small quantities for home consumption.

QUAIL TRAP.

An example of a peculiar kind of trap for quail (burong sioul) was observed in the Ulu Langat. It appears that the quail come to eat the fruit which falls from a tree called "unang," and the Sakais knowing this set up a trap consisting of a long tapering basket of rattan, whose mouth is enclosed in a fence or screen of green branches facing towards the place where the fallen fruit is lying. A bee-hive hut of bertam leaves is then built not far from the trunk of the tree. A cord, one end of which is led into the hut, runs behind the quails' feeding ground and is attached at its other end to the base of a small tree. A man conceals himself in the hut, and when the quail come to feed, jerks the cord up and down; the quail, making for cover, see in the mouth of the trap a convenient hole shaded by bushes and run into it.

WEAPONS.

BLOW-PIPES.

The blow-pipes collected or seen on the expedition were all of the same type, having a conical wooden mouthpiece and an inner tube composed of two pieces of bamboo placed end to end and joined by a covering section of the same material. The muzzles are bound with rattan and covered with damar. A large part of the outer tube nearest the mouthpiece is decorated with circular and other designs; above this is a plain polished portion from which the outer skin of the bamboo has been removed, and between this and the damar covered muzzle is a small length covered with patterns. These patterns were said not to be representations of anything in particular but to be merely decorations.

QUIVER AND DARTS.

Four types of quiver were found on the Kenaboi side of the divide. One bought in the extreme "ulu" had a conical cover of plaited rattan, the sides of which are concave. The other three types were all seen in the settlement near the Kenaboi Mine. One quiver had a cap of the usual three sided, Selangor type; of the other

two, one had a conical wooden cover with rattan sides similar to those used by the Besisi, and the other a flat topped cover of plaited rattan with a button in the centre. A rectangular panel, such as is generally found among the Mantra, had been incised on the body of this quiver below the place of attachment of the waist cords. It was, moreover, interesting as it contained two porcupine quills which were used as charms to make the darts fly true and some pieces of monkey's fur which were considered potent in attracting monkeys to the hunter. The quivers were all said to be locally manufactured, the type with the three-sided cover being made by the women, and the other types by the men. Two varieties of dart head were seen, one plain, the other marked with a cross. The poison on the darts marked with a cross was said to be the stronger of the two.

IPOH POISON.

The people living near the Kenaboi Mine use a dart poison composed of a mixture of Ipoh sap, *getah rotan* and the sap of a tree called *kayas*. Fowls and pigs are reported to be immune to pure Ipoh poison, but Ipoh mixed with *getah rotan* is said to prove fatal.

TATTOOING.

True tattoo marks were noticed on the arms of several men, both in the Langat and Kenaboi valleys. Careful enquiries were made with regard to the origin of this practice, and the Sakai all seemed to agree that it was a newly introduced custom, which had probably been borrowed from the Chinese. One man seen in the Ulu Langat had a distinct swastika mark on the inside of the left forearm and a floral design above the elbow on the same arm. If this custom is new it must be spreading rather rapidly for a considerable amount of tattooing is also to be seen among the Besisi of Tamboh in Selangor.

DRESS AND PERSONAL ORNAMENTS.

Many of the men seen were wearing only a waist-cloth. This was either of European stuff or of the native bark cloth. Armlets of plaited rattan were fashionable among the men and were often decorated with sprigs of sweet scented leaves. Several tortoise-shell finger rings were collected in the Ulu Langat and some fine necklaces of shaped and polished monkey-bones in the village near the Kenaboi Mine. Necklets and bracelets of "urat batu," the rhizomorph of a fungus, were much worn by the women on both sides of the divide. These necklaces are regarded as a charm against "*hujan panas*" (light showers alternating with periods of sunshine like "April showers" at home) which is much disliked and feared by the aborigines. A small ear plug of red wood and a hair-skewer of the same material were procured from a woman in the Ulu Kenaboi. Necklaces of threaded white seeds and small pieces of wood were also obtained, together with other more hackneyed objects.

MUSICAL INSTRUMENTS.

The only musical instruments seen were flutes, bamboo stampers and the Æolian bamboo. The last named were common in the village near the Kenaboi Mine. Measurements by finger breadth are used in making the stops of a flute. In an example with three stops which was obtained, the second stop was two finger breadths above the lowest and the third four finger breadths from the second.

LANGUAGE

The language used by all the aborigines met with was Malay interspersed with a few non-Malay elements. The pronunciation and intonation were somewhat rough and final k's were sounded. The vocabularies obtained from these people both in the Ulu Langat and Ulu Kenaboi are practically identical † and seem on the evidence of such words as are non-Malay to belong to the Mantra group of dialects. Examples of non-Malay or archaic words are given below.

English	Malay	Vocabulary taken in Ulu Langat.	Vocabulary from far Ulu Kenaboi.	Vocabulary from near Kenaboi. Mine.
Mother	... ibu	... mui	... moie	... mui
Child	... anak	... enek	...	... enek
Elder brother	... abang	... ge-hek	...	... ge-hek
Elder sister	... kakak	... gah-uk	...	... gah-u
Wild pig	... babi utan	... mantol	...	... mantol
Bear cat	... benturong	... mawai	...	... maweit
Loris	... kongkang	... kukang	...	... kukang
Gibbon	... ungka	... timok (k pronounced)	...	... timok
Owl	... burung hantu...	...	...	... burungkunga, tekok
Crow	... burung gagak...	... burung dendang *	...	... *
Millipede	... sepat bulan	... kalui	...	... kalui
Mosquito	... nyamok	... kemus	...	... kemus
Tapioca	... ubi kayu	... galoh	...	... galow
Yam	... keledek	... tilah	...	... tilah
Suore	... berdengkur	... sengkok	...	... *
Jump	... melompat	... mehamu	...	... *
Throw	... lontar	... lutar	...	... *

* Stands for Malay word used.

† The second vocabulary was obtained from a stupid and suspicious native at whose house a half-hour's halt was made. It is probably very incomplete.

English.	Malay.	Vocabulary taken in Ulu Langat.	Vocabulary from far Ulu Kenaboi.	Vocabulary from near Kenaboi Mine.
Hut	... pondok	... punong	... *	...
Blowpipe	... sumpitan	... temiang *	... temiang *	temiang*
Mouthpiece of blowpipe	pangkal sumpi- tan	tebong-temi- aug	t e b o n g - temiang	tebong- temiang
Quiver for blow- arrows	tabong beka s damak	telak	... simpai (?)	t e l a k damak
Quiver cords	... tali tabong	... tali telak	... tali tem- baran (?)	tali telak
Butt of dart	.. pangkal damak	pahabong	... *	... p a h a - bong
Dart-holder	... sarong damak	plet	... plet	... plet
Muzzle	... ujung sumpitan	*	... sengkak temiang	g e l o i temiang
Finger nail	... kuku	...	...	... kokut
Diarrhoea	... cheret	...	...	... remoin
Cough	... batuk	...	...	... gahi
Wife	... bini	...	...	... oie
Tapir	... tenok	...	...	.. j e l a u (jungle pantang langu- a g e)
Flying-lizard	... chichak kabin	*	...	* ... c h i n g - kuai
To scratch	... garu	... garu-i	...	* ... koweit
Thunder	... guroh	...	...	* ... grentah

HEAD MEASUREMENTS.

Length.	Breadth.	Cephalic index.
(1) 176 ...	138 ...	78.4 Ulu Langat
(2) 179 ...	143 ...	79.8 "
(3) 176 ...	148 ...	84.0 "
(4) 180 ...	132 ...	73.3 "
(5) 183 ...	142 ...	77.5 "
(6) 177 ...	146 ...	82.4 Far Ulu Kenaboi
Greatest cephalic index	...	... 84.0
Least	" "	... 73.3
Average	" "	... 79.2

* Stands for Malay word used.

NASAL MEASUREMENTS.

	Length.		Breadth.		Nasal index.
(1)	49	...	39	...	82.9
(2)	43	...	39	...	90.6
(3)	44	...	40	...	90.9
(4)	49	...	35	...	71.4
(5)	47	...	17	...	99.9

The measurements taken were so few that it would be unfair to draw any very definite conclusions from them, but in so far as they go they do not seem inconsistent with the aborigines' story of their mixed origin, for in a very small series there is a large degree of variation, ranging in the cephalic indices from marked brachycephaly to equally marked dolicocephaly.

Selangor, lying as it does, between Southern Perak with its almost pure blooded Sakai and Negri Sembilan with its proto-Malays (Mantra, Biduanda, etc.) is undoubtedly occupied by many aboriginal tribes of mixed blood of which the people of the Langat and Kenaboi rivers are probably one.

ON A COLLECTION OF BIRDS FROM THE SIAMESE PROVINCE OF BANDON, N.E. MALAY PENINSULA.

By H. C. ROBINSON, C.M.Z.S., M.B.O.U.

THE province of Bandon, with which the present paper is concerned, is situated on the eastern side of the Malay Peninsula, between long. $98^{\circ} 30'$ and $99^{\circ} 40'$ E., and lat. $9^{\circ} 10'$ and $8^{\circ} 30'$ N. It is bounded on the south and east by the province of Nakon Sitamarat, on the west by Takopah and on the north by Chaiya. As yet it is comparatively little developed though the Siamese Bangkok-Singapore Railway, which traverses its eastern districts, will do much to remedy this. At present its principal production is timber, of which large quantities are cut in the forests to the west of the province, floated down the Bandon river, which is one of the most navigable in the Malay Peninsula, and dealt with by a large and well equipped saw mill at Bandon town, the cut timber being mainly utilized at Bangkok but exported also to Kelantan, Trengganu and Singapore and even to Europe. A little tin is also produced and a small amount of wolfram from a mine on the coast, but the mineral output is as yet insignificant.

The population is exclusively Siamese or at least Siamese speaking, though on the coast there is a slight admixture of Malay blood which is more pronounced on the coast of Chaiya, to the north among the fishing population.

The coast, except on the south-east where it is rocky with a sandy beach, is low and mangrove grown, succeeded towards the interior by a belt of sandy barren land overgrown in places by *Melastoma* scrub and in others by stretches of *galam* (*Melaleuca leucodendron*).

At the base of the hills stretches a large area of very fertile land occupied by villages and rice fields but the province, as a whole, is stated to be sparsely inhabited as compared with its southern neighbour Nakon Sitamarat. Roads are as yet in a backward condition, but their lack is in large part supplied by the Bandon river, which except in the dry season is navigable for steam launches for nearly a hundred miles from its mouth, which unfortunately is blocked by a very broad and very shallow bar, not carrying more than six or seven feet of water at any tide.

The only considerable town is Bandon, about three or four miles from the mouth of the river, a thriving little place of apparently about six or seven thousand inhabitants with a large number of Siamese and Chinese shops, a detachment of the provincial *gendarmerie* and a considerable number of officials.

The birds collected in the province of Bandon, with the exception of perhaps half a dozen specimens obtained *en route*, were all secured in three localities regarding which it may perhaps be of interest to give some particulars.

1. BAN KOK KLAP.

A large hamlet in the amphur of Lampum on the banks of the river of that name, which is a fair sized tributary of the Bandon river, the village is about four miles to the west of the main line of the Bangkok-Singapore Railway, which has a station at Lampum and on which ballast trains were already running at the time of our visit.

The village is situated at the foot of the range of hills running about N.W. to S.E., which in their northern part separate the province of Bandon from that of Nakon Sitamarat, attaining a maximum elevation of slightly over 4,200 feet in Kao Nawng.

The population in the neighbourhood of Ban Kok Klap was considerable; there was much cultivated land, orchards in which betel palms, mango, langsat and coconut palms were the principal fruit trees, large tracts of rice and patches of Indian corn and hill padi. Much destruction of jungle has taken place for these last two products, the abandoned land growing up in bamboo and secondary growth amongst which a species of stinging shrub was very common.

To the north and east of the village were several limestone hills, of the type usual in the Malay Peninsula, all of them much fissured and shattered, though no caves of any considerable extent seem to occur in them.

The fauna was not of any special interest being very similar to that found in Trang on the other side of the main range.

In the rice fields, wood-duck, tree-teal and wattled plovers were very common and an occasional pea-fowl was met with, though these are much more abundant when the padi is in ear, the rice fields being in stubble at the time of our visit.

In the orchard lands hill-mynas (*Eulabes*), glossy starlings (*Calornis*), pied hornbills (*Anthraceros*) and several species of wood-pecker were the most noticeable birds, while in the bamboo thickets jungle partidges (*Caloperdix* and *Tropicoperdix*) were very abundant but were almost impossible to obtain owing to a long continued drought having so dried up the dead leaves underfoot that, even for a Dyak, a noiseless approach was out of the question.

We collected at Ban Kok Klap from 29th June to 6th July, 1913.

2. KAO NAWNG (lower camp).

This was situated on the upper reaches of the river flowing past Ban Kok Klap, probably about fifteen miles distant from that place at a height above sea-level of about 1,200 feet and quite close to the divide leading down to Nakon Sitamarat.

Owing partly to an actual scarcity of elephants and partly to the reluctance of the owners to use them for transport purposes on the plea that this damages their efficiency for timber hauling, which is their principal use, we had to rely in the main on coolies.

Though quite willing, the local Siamese were extraordinarily inefficient as jungle carriers, and all loads other than those of the most trifling weight had to be carried slung on a pole between two men.

After about the first five miles, when the primary jungle was entered, there was practically no path, the track taken being along the banks of the river itself, which in places was deep and rapid and had to be crossed between thirty and forty times. Under these circumstances progress was slow, and though our impedimenta were reduced to a minimum and there was no lack of coolies we did not arrive at our destination until the afternoon of the second day, though, as stated above, the total distance traversed could not have been more than fifteen miles. Owing to the rocky and broken nature of the country there was some difficulty in finding a suitable site for a camp, which was enhanced by the fact that there were no suitable palm leaves for roofing purposes, banana leaves, which are very perishable and unsatisfactory, having to be used.

During our stay on the mountain, which lasted from 11th June to 28th June, the weather was very unfavourable. There was always a strong wind, and rain, though at no time heavy, was almost continuous after about 10 a.m. Birds and animals were by no means numerous.

3. KAO NAWNG (upper camp).

During our stay on the mountain a party was detached for work at higher elevations and a camp was established at about 3,500 feet, a few hundred feet below the extreme summit of the range, in a saddle between two peaks. The weather was extremely wet and windy, the collecting ground very limited in extent, owing to the steepness of the mountain, and covered with very dense and matted vegetation, and the results were therefore not large, though several very interesting species both of birds and mammals were obtained.

The principal object in collecting on these hills which have never previously been visited by a naturalist was to ascertain what relationship their fauna bore to that of the main peninsular range to south and to that of the Tenasserim mountain Nwalabo and Muleyit to the north.

As might be expected, the present collections show that the fauna is almost exactly intermediate, so much so that in many cases it is difficult to state whether a specimen should be assigned to the Tenasserim or the Malayan race, when these have been separated. The area of these hills above the 3,000 feet and 4,000 feet contours is

however so small that the mountain fauna is correspondingly limited and it is therefore not safe to draw any deductions from the absence or presence of particular species.

Many forms strictly confined to the zone above 3,000 feet in the south of the Malay Peninsula here occur at elevation of 1,000 feet or under while certain species such as *Cyanops oorti* and *Oriolus consanguineus* of insular facies, common everywhere in the hills of Selangor and Perak, are not met with on Kao Nawng and presumably do not occur.

The following species not hitherto recorded from the Malay Peninsula were collected :

Pseudotantalus leucocephalus (Penn.) ;

Cyanops davisoni (Hume) ;

Anthipes submoniliger, Hume ;

Anthipes olivacea (Hume) ;

Cryptolopha youngi, sp. nov. ;

Thringorhina guttata (Tick.) ;

Puoepyga pusilla, Hodgs. ;

Æthopyga sanguinipectus, Wald.

Without the active co-operation of the local authorities jungle travel in the Siamese portions of the Malay Peninsula is practically impossible to a stranger. Our most hearty thanks are therefore due, in the first place to H.R.H. Prince Damrong, Minister of the Interior, Siam, who provided us with the necessary introductions, and in the second to the Acting Governor of Bandon and to the amphurr* of Laupum, who treated us most courteously and took an infinity of trouble in securing the large amount of transport that we required. Without their aid we should have been tied to the line of the railway and would have obtained no results of any particular interest.

PHASIANIDÆ.

1. ARBORICOLA CHARITONI.

Arboricola charltoni (Eyton) ; Ogilvie Grant, Cat. Birds Brit. Mus., xxii., p. 221 (1893) ; Robinson, Journ. Fed. Malay States Mus., v., p. 15 (1913).

These jungle partridges are apparently fairly common in the north of the Peninsula, though they are extremely rare south of the latitude of Taiping in central Perak. Near Ban Kok Klap they were very numerous in dry jungle but very wary and almost impossible to approach. Mr. Seimund, who obtained one specimen, describes the note as a soft low double whistle. The small native boys occasionally shoot them with pellet bows. They make excellent eating.

* An official corresponding to the District Officer in the Federated Malay States

"Male, iris dark hazel, bill blackish, yellowish green at tip of lower mandible, reddish at base, orbital skin reddish orange, tarsi and claws waxy yellow."

ROLLULUS ROULROUL.

Rollulus roulroul (Scop.); Ogilvie Grant, tom. cit., p. 225.

Several crested wood quail, which is the commonest game-bird in the jungles of the Malay Peninsula, were shot on Kao Nawng but were consigned to the pot as they were in very poor feather

2. CALOPELDIX OCULEA.

Calooperdix oculea (Temm.); Ogilvie Grant, tom. cit., p. 222, Robinson and Kloss, Ibis, 1910, p. 671; Robinson, Journ. Fed. Malay States Mus., v, p. 15 (1913).

Evidently very common in Bandon, though we did not ourselves procure specimens. Caged birds were frequently seen in the possession of the local Siamese and a male, recently caught, was purchased at Ban Kok Klap.

GALLUS GALLUS.

Gallus gallus (Linn.); Grant, tom. cit., p. 344.

Gallus bankiva, Robinson and Kloss, tom. cit., p. 673.

Jungle fowl were very numerous in the vicinity of Ban Kok Klap and along the banks of the river, south of that place. No specimens were however preserved. The hens of the local domestic fowl were almost indistinguishable from wild birds.

3. ARGUSIANUS ARGUS.

Argusianus argus (Linn.); Ogilvie Grant, tom. cit., p. 363.

Very numerous on Kao Nawng and not so shy as in many other places though they are much trapped by Siamese as the skins command a good price among the Chinese on the coast. We had not the time to set snares and did not particularly desire specimens, but one female was obtained and one or two males approached and shot at by Seimund. Argus pheasants are poor eating being usually very thin and dry and are not to be compared with peafowl.

1. PAVO MUTICUS.

Pavo muticus, Linn.; Ogilvie Grant, tom. cit., p. 371; Robinson and Kloss, tom. cit., p. 672.

Peafowl were fairly common round the edges of the rice fields at Ban Kok Klap, and two or three were shot for food but not preserved. They were in very poor feather, without trains, which in this district are not assumed until November or December.

TRERONIDÆ.

OSMOTRERON VERNANS.

Osmotreron vernans (Linn.); Salvad., Cat. Birds Brit. Mus., xxi., p. 60 (1893); Robinson and Kloss, tom. cit., p. 674.

One or two specimens of the common green pigeon were shot but not preserved.

COLUMBIDÆ.

TURTUR TIGRINUS.

Turtur tigrinus (Temm and Knip); Salvad., tom. cit., p. 440; Robinson and Kloss, tom. cit., p. 675.

Exceedingly numerous on the rice stubbles at Ban Kok Klap, in flocks sometimes numbering as many as twenty individuals. No specimens were preserved.

5. CHALCOPHAPS INDICA.

Chalcophaps indica (Linn.); Salvad., tom. cit., p. 514; Robinson and Kloss, tom. cit., p. 675.

Very common as everywhere else in the Peninsula.

CHARADRIIDÆ.

SARCOGRAMMUS ATRINUCHALIS.

Sarcogrammus atrinuchalis, Jerdon; Sharpe, Cat. Birds Brit. Mus., xxiv., p. 152 (1896); Robinson and Kloss, *Ibis*, 1911, p. 11.

Also very common on the rice fields.

RALLIDÆ.

6. RALLINA FASCIATA.

Rallina fasciata (Raffles); Sharpe, Cat. Birds Brit. Mus., xxiii., p. 75 (1894).

This rail was fairly common at Ban Kok Klap at the edges of the rice fields but only a single male was obtained.

"Iris orange, periocular skin carmine bill greenish horn, blackish on culmen, carmine at base, feet carmine."

CICONIIDÆ.

DISSURA EPISCOPUS.

Dissura episcopus (Bodd.); Sharpe, Cat. Birds Brit. Mus., xxvi., p. 294 (1898); Robinson and Kloss, tom. cit., p. 16.

Common on the rice fields, roosting at night on lofty dead trees at the edge of the jungle.

7. PSEUDOTANTALUS LEUCOCEPHALUS.

Pseudotantalus leucocephalus (Penn.); Sharpe, tom. cit., p. 323.

This is a new record for the Malay Peninsula, though the Museum possesses three specimens collected on Langkawi in December, 1912, and an immature bird shot near Kuala Lumpur in 1911, which was wrongly identified with *Pseudotantalus lacteus*.

In Bandon the species was very common but excessively wary and hard to obtain. It was seen either singly or in small numbers on the rice fields but collected in large flocks towards evening and roosted on lofty trees in company with *Dissura episcopus* and *Graptocephalus davisoni*. In the south of the Peninsula it is replaced by *Ps. lucens*, which, however, appears to be almost exclusively a marine species.

IBIDIDÆ

8. IBIS MELANOCEPHALA.

Ibis melanocephala (Lath.); Sharpe, Cat. Birds Brit. Mus., xvi., p. 8 (1898).

Seimund obtained one specimen out of a large flock feeding on the mud-flats at the mouth of the Bandon river. The species is by no means scarce in the Malay Peninsula but is always very wary and difficult to obtain.

9. GRAPTOCEPHALUS DAVISONI.

Graptocephalus davisoni (Hume); Sharpe, tom. cit., p. 14 (1898). Robinson and Kloss, tom. cit., p. 17.

One male was shot out of a flock roosting on a very lofty tree on the banks of the Bandon river.

ARDEIDÆ

10. HERODIAS ALBA

Herodias alba (Linn.); Sharpe, Cat. Birds Brit. Mus., xvi., p. 93 (1898).

Seimund shot a male from out of a large flock at Bandon on 4th June. The bird is moulting into breeding plumage and the ornamental train is beginning to appear but the feet are dull black and the bill uniform chrome yellow as in the winter plumage. Like other specimens from the Malay Peninsula the size is very small, the dimensions being, wing 12.1, culmen, 4.1 and tarsus, 5.6 inches.

ANATIDÆ.

11. ASARCORNIS LEUCOPTERA.

Asarcornis scutulata (part.) Salvad., Cat. Birds Brit. Mus., xxvii., p. 60 (1895).

Asarcornis leucoptera (Blyth); Robinson and Kloss, tom. cit., p. 19.

Fairly common on the rice fields upcountry in Bandon and almost down to the coast, generally in pairs but sometimes in larger numbers. A male was shot at Ban Kok Klap.

12. DENDROCYCNA JAVANICA.

Dendrocygna javanica (Horsf.); Salvad., tom. cit., p. 156; Robinson and Kloss, tom. cit., p. 21.

Very common in flock of considerable size but rather wild as they are much shot at by the Siamese.

FALCONIDÆ.

13. LOPHOSPIZIAS TRIVIRGATUS.

Astur trivirgatus (Temm.); Sharpe, Cat. Birds Brit. Mus., i., p. 105 (1874).

An immature male, though in very worn plumage with the primaries abraded, has the wing slightly over 9 inches and would therefore appear to belong to the Himalayan and Assamese race. *A. rufitinctus* (McClell.). Specimens from the more southern parts of the Peninsula are decidedly smaller.

"Iris lemon orange, feet chrome yellow."

14. SPILORNIS PALLIDUS.

Spilornis pallidus, Walden; Sharpe, tom. cit., p. 290, pl. ix; Robinson and Kloss, tom. cit., p. 23.

A male from Ban Kok Klap, wing about 14.8 in.

15. MICROHIERAX FRINGILLARIUS.

Microhierax fringillarius (Drap.); Sharpe, tom. cit., p. 367; Robinson and Kloss, tom. cit., p. 24.

One male from Ban Kok Klap.

16. MACHÆRAMPHUS ALCINUS.

Machæramphus alcinus (Westerm.); Sharpe, tom. cit., p. 408.

Coming down stream from Ban Kok Klap we met with two pairs of this rare kite, and Seimund shot a male. They were nesting high up in very lofty trees from which the natives extract dammar (*Dipterocarpus crinitus*) and when disturbed seemed half dazed by the light and flew comparatively slowly.

We were unfortunately unable to spare the time to attempt to secure the eggs. Normally these hawks are crepuscular in their habits feeding on bats and are of very rapid and powerful flight. The species is widely spread throughout the Peninsula and at one time was not uncommon in the vicinity of Kuala Lumpur.

PANDIONIDÆ.

17. POLIOÆTUS HUMILIS.

Polioætus humilis (Müll. and Schleg.); Sharpe, tom. cit., p. 454.

The smaller grey-headed fishing eagle is confined to the upper reaches of the rivers and to jungle country and is not found on the coast or in open country. A female was shot coming down stream from Ban Kok Klap on the Bandon river.

STRIGIDÆ.

18. KETUPA CEYLONENSIS.

Ketupa ceylonensis (Gm.); Sharpe, Cat. Birds Brit. Mus., ii., p. 4 (1875); Robinson and Kloss, tom. cit., p. 30.

Not so common as the succeeding species. One specimen was secured near Ban Kok Klap.

19. KETUPA JAVANENSIS.

Ketupa javanensis (Less.); Sharpe, tom. cit., p. 8; Robinson and Kloss, tom. cit., p. 30.

Very common throughout the Peninsula, wherever there are extensive rice fields.

20. GLAUCIDIUM BRODIEI.

Glaucidium brodiei (Burton); Sharpe, tom. cit., p. 212.

A female, precisely agreeing with specimens from the hills of South Perak and Selangor, was obtained at between 3,000 feet and 4,000 feet on Kao Nawng.

21. SCOPS LEMPIJI.

Scops lempiji (Horsf.); Sharpe, tom. cit., p. 91; Robinson and Kloss, tom. cit., p. 31.

A female from Ban Kok Klap.

22. HETEROSCOPS VULPES.

Pisorhina lucie, Hartert, Nov. Zool., ix., p. 541 (1902).

Heteroscopus vulpes, Ogilvie Grant, Bull. B.O.C., xix., p. 11 (1906), Id. Journ. Fed. Malay States Mus., iii., p. 51, pl. iii (1908)

An adult female from 3,500 feet on Kao Nawng.

Compared with four skins from Selangor and Perak this specimen is much more uniform foxy brown above with the black markings much reduced in amount. Below, it is paler in tint, vinaceous brown with the middle of the abdomen and the under tail-coverts almost pure white. The differences are quite striking but in so very variable a group as the scops owls it is not advisable to describe a new species on a single individual only.

PSITTACIDÆ

23. LORICULUS VERNALIS.

Loriculus vernalis (Sparrm.); Salvad., Cat. Birds Brit. Mus., x., p. 517 (1891); Robinson and Kloss, tom. cit., p. 32.

Three females from Ban Kok Klap.

"Iris white, bill orange, feet lemon orange."

ALCEDINIDÆ.

24. ALCEO EURYZONA.

Alcedo euryzona, Temm.; Sharpe, Cat. Birds Brit. Mus., xvii., p. 158 (1892); Robinson and Kloss, tom. cit., p. 33.

Quite common in those parts of Bandon visited by us wherever running water and jungle occur but most abundant on the lower slopes of the mountains. The birds are very shy and restless, never staying long in one place, but we procured four specimens, two males and two females, near the lower camp on Kao Nawng.

"Male, iris dark hazel, bill black, the tip white, feet pale flesh. Female, bill blackish, reddish brown at the base of the lower mandible with the tip whitish."

25. *CEYX EUERYTHRA*.

Ceyx euerythra, Sharpe, tom. cit., p. 179; Robinson and Kloss, tom. cit., p. 33.

Not very common; we only procured one specimen at Ban Kok Klap.

26. *CARCINEUTES PULCHELLUS*.

Carcineutes pulchellus (Horsf.); Sharpe, tom. cit., p. 198; Robinson and Kloss, tom. cit., p. 34.

A female from Kao Nawng and a male from Ban Kok Klap.

"Male, iris hazel, bill vermilion, feet orange brown."

27. *HALCYON SMYRNENSIS*.

Halcyon smyrnensis (Linn.); Sharpe, tom. cit., p. 222; Robinson and Kloss, tom. cit., p. 34.

Common everywhere in the rice fields.

MEROPIDÆ.

28. *MELITTOPHAGUS SWINHOII*.

Melittophagus swinhooi (Hume); Sharpe, Cat. Birds Brit. Mus., xvii., p. 55 (1892); Robinson and Kloss, op. cit., p. 36.

Common in open country throughout the district traversed.

29. *MEROPS SUMATRANUS*.

Merops sumatranus, Raffles; Sharpe, tom. cit., p. 61; Robinson and Kloss, p. 37.

In similar situations to the preceding but not so common. An immature female with the top of the head uniform in colour with the mantle was obtained at Bandon on 10th July.

30. *NYCTIORNIS AMICTA*.

Nyctiornis amicta (Temm.); Sharpe, tom. cit., p. 90; Robinson and Kloss, p. 37.

Perhaps not so common as in the more southern parts of the Peninsula, though it was seen on Kao Nawng up to about 2,000 feet and obtained at Ban Kok Klap and Bandon.

TROGONIDÆ.

31. *PYROTROGON ORESCIUS*.

Harpactes orescius (Temm.); Ogilvie Grant, Cat. Birds Brit. Mus., xvii., p. 494 (1892).

Pyrotrogon orescius, Robinson and Kloss, tom. cit., p. 39.

Fairly common near Ban Kok Klap, whence four specimens were obtained. Our Dyaks however always rather shirk shooting both this and other species of the genus, partly from the fact that they are omen birds and therefore unlucky to kill but principally for the more material reason that they are exceedingly troublesome to skin.

CUCULIDÆ.

32. *HIEROCOCCYX NISICOLOR.*

Hierococcyx fujax (Horsf.); Shelley, Cat. Birds Brit. Mus., xix., p. 236 (1891).

Hierococcyx nasicolor (Hodgs.); Robinson and Kloss, tom. cit., p. 40.

An adult of undetermined sex from Ban Kok Klap.

"Iris hazel, feet and claws chrome, bill yellowish green at base, black at tip of lower mandible and on culmen, orbital skin rich lemon."

33. *CHALCOCOCCYX ZANTHORHYNCHUS.*

Chalcococcyx zanthorhynchus (Horsf.), Shelley, tom. cit., p. 289; Robinson and Kloss, tom. cit., p. 41.

This beautiful little cuckoo was fairly common at Ban Kok Klap, where two adult males and an immature female, with the head almost uniform chestnut and with but little greenish gloss on the dark bars of the upper surface, were obtained.

Adult male "Iris red, orbital skin vermilion, bill orange, vermilion at base, feet greenish slate."

In the south of the Peninsula both this species and the emerald cuckoo, *Ch. maculatus* are rare and possibly only seasonal visitors, but in the northern districts both species are much commoner.

34. *CENTROPUS SINENSIS INTERMEDIUS.*

Centrococcyx intermedius (Hume), Stray Feath., i., p. 454 (1873).

Centropus sinensis (Steph.); Shelley, tom. cit., p. 343; Robinson and Kloss, tom. cit., p. 41.

Centropus sinensis intermedius, Stresemann, Nov. Zool., xx., p. 322 (1913).

A single female, wing 212 mm., from Ban Kok Klap.

"Iris carmine, bill and feet black."

As Stresemann (*loc. cit.*) states the forms of pheasant cuckoo inhabiting the northern and southern districts are quite distinguishable, the present race being considerably smaller, especially in the length of the tail; the interscapular region is also of a darker chestnut. The name applicable to the southern race is *Centropus sinensis bubutus*, Horsf. [*Trans. Linn. Soc.*, xiii., p. 180 (1822)].

35. UROCOCYX ERYTHROGNATHUS.

Urococcyx erythrognaethus (Hartl.); Shelley, tom. cit., p. 398
Robinson and Kloss, tom. cit., p. 43.

• Exceedingly common both in primary and secondary jungle.
“Male, iris pale blue, female, orange.”

36. RHOPODYTES TRISTIS.

Rhopodytes tristis (Less.); Shelley, tom. cit., p. 386; Robinson and Kloss, tom. cit., p. 42.

A female was shot on the upper portion of Kao Nawng at about 3,000 feet. The species is extremely common throughout the country in the northern parts of the Peninsula, though in the south it is only found at elevations above 3,000 feet.

37. ZANCLOSTOMUS JAVANICUS.

Zanclostomus javanicus (Horsf.); Shelley, tom. cit., p. 370; Robinson and Kloss, tom. cit., p. 42.

Very common in jungle near Ban Kok Klap, though we did not trouble to collect many specimens.

CAPITONIDÆ.

38. CHOTORHEA CHRYSOPOGON.

Chotorhea chrysopogon (Temm.); Shelley, Cat. Birds Brit. Mus., xix., p. 57 (1891); Robinson and Kloss, tom. cit., p. 43.

Common in the jungle on Kao Nawng as elsewhere in the Peninsula.

“Iris hazel grey, bill black, whitish at base, feet greenish.”

39. CHOTORHEA MYSTACOPHANES.

Cyanops mystacophanes (Temm.); Shelley, tom. cit., p. 72.

Chotorhea mystacophanes, Robinson and Kloss, tom. cit., p. 43.

Very common on Kao Nawng; rarer in the southern parts of the Peninsula.

“Iris hazel, bill black, feet greenish.”

40. CYANOPS DAVISONI.

Cyanops davisoni (Hume); Shelley, tom. cit., p. 65, pl. IV, fig. 1.

Two specimens of this species were obtained by the Dyaks at the upper camp on Kao Nawng between three and four thousand feet. The locality is a considerable extension of range for the species which has not hitherto been known south of Central Tenasserim.

41. MESOBUCCO CYANOTIS.

Mesobucco cyanotis (Blyth); Shelley, tom. cit., p. 87; Robinson and Kloss, tom. cit., p. 43.

The adults are quite typical specimens of this race with blue ear coverts unmingled with black. The species is found both in jungle and in open country.

42. ZANTHOLÆMA HÆMATOCEPHALA.

Zantholæma hæmatocephala (Mull.); Shelley, tom. cit., p. 89; Robinson and Kloss, tom. cit., p. 44.

The Coppersmith was fairly common in the low country and its note was often heard, though only one specimen was actually obtained.

PICIDÆ.

43. GECINUS VIRIDANUS.

Gecinus viridanus (Blyth); Hargitt, Cat. Birds Brit. Mus., xviii., p. 47 (1890); Robinson and Kloss, tom. cit., p. 45.

Two males and a female from the open country round Ban Kok Klap.

44. CHRYSOPHLEGMA MALACCENSE.

Chrysophlegma malaccense (Lath.); Hargitt, tom. cit., p. 122; Robinson and Kloss, tom. cit., p. 46.

A single male from Ban Kok Klap.

45. CHRYSOPHLEGMA HUMIL.

Chrysophlegma humil., Hargitt, tom. cit., p. 126; Robinson and Kloss, tom. cit., p. 46.

Two females from Kao Nawng.

"Iris hazel brown, upper mandible plumbeous green, lower greenish horn, feet greenish."

46. GECINULUS VIRIDIS.

Gecinulus viridis (Blyth); Hargitt, tom. cit., p. 136.

A single female from Ban Kok Klap, shot among bamboos.

47. MIGLYPTES GRAMMITHORAX.

Miglyptes grammithorax (Mall.); Hargitt, tom. cit., p. 385; Robinson and Kloss, tom. cit., p. 46.

Three females from Kao Nawng.

"Iris chestnut, feet plumbeous green, bill lead colour."

48. MICROPTERNUS BRACHYURUS.

Micropternus brachyurus (Vieill.); Hargitt, tom. cit., p. 396.

A male from Ban Kok Klap.

49. TIGA JAVANENSIS.

Tiga javanensis (Ljung); Hargitt, tom. cit., p. 412; Robinson and Kloss, tom. cit., p. 47.

A single female from Ban Kok Klap.

50. ALOPHONERPES PULVERULENTUS.

Hemilophus pulverulentus (Temm.); Hargitt, tom. cit., p. 494.

Alophonerpes pulverulentus, Robinson and Kloss, tom. cit., p. 47.

A very young male was brought in by natives at Ban Kok Klap.

51. SASIA ABNORMIS.

Sasia abnormis (Temm.); Hargitt, tom. cit., p. 557; Robinson and Kloss, tom. cit., p. 48.

A female from Kao Nawng.

EURYLÆMIDÆ.

52. CALYPTOMENA VIRIDIS.

Calyptomena viridis, Raffles; Selater, Cat. Birds Brit. Mus., xiv., p. 456 (1888); Robinson and Kloss, tom. cit., p. 48.

Common.

"Iris hazel, bill and feet yellowish green."

A nest was found on 25th June hanging from a bough over water. It resembles the nest of the Rouge-et-Noir Broadbill, *Cymbirhynchus macrorhynchus*, and is an elongated bag-shaped structure composed of dead leaves and interwoven fibre, with the entrance at the side near the top. It contained two eggs, which were hard set. They are light creamy yellow in colour, somewhat glossy and in shape are elongated ovals measuring, A. 21.7×31 , B. 21.2×31.5 mm., approximately, the eggs being very much broken.

53. EURYLÆMUS JAVANICUS.

Eurylæmus javanicus, Horsf.; Selater, tom. cit., p. 463.

A male, female, and an immature female are in the collection, from the lower slopes of Kao Nawng, where it is rather commoner than the preceding species.

"Iris blue, bill robins' egg blue, tip of upper mandible greenish, tomia of both mandibles black, feet dirty pink."

54. EURYLÆMUS OCHROMELAS.

Eurylæmus ochromelas, Raffles; Selater, tom. cit., p. 465; Robinson and Kloss, tom. cit., p. 50.

In deep jungle on Kao Nawng, at 1200-1500 feet; not particularly common.

"Iris lemon yellow, bill robins' egg blue, black on edges, greenish on upper mandible, feet dirty pinkish brown."

55. CYMBIRHYNCHUS MALACCENSIS.

Cymbirhynchus macrorhynchus (Gm.); Selater, tom. cit., p. 468 (partim).

Cymbirhynchus malaccensis, Salvad, Atti. R. Accad. Tor., ix, p. 425; Robinson and Kloss, tom. cit., p. 50.

Not found in very deep jungle on the slopes of the mountains but abundant along the courses of the larger rivers, the large untidy nests, resembling debris from floods hanging from pendant bamboos over the water.

56. SERILOPHUS ROTHSCILDI.

Serilophus rothschildi, Hartert and Butler, Bull. B.O.C., lix, p. 50 (1898); *id.*, Ibis, 1898, p. 434.

Five specimens were collected on Kao Nawng, adults and young.

"Male, iris hazel, bill pale blue, tomia white, base including nostrils orange, periocular space, wax-yellow, feet the same, tinged with greenish claws bluish."

Compared with specimens of the true *S. rothschildi* from the mountains of Perak and Selangor these specimens show a very decided approach to *S. lunatus*, Gould, which is found throughout the greater portion of Tenasserim. The head and ear-coverts are tinged with clay brown not almost pure gray as in *S. rothschildi*, and the chestnut of the secondaries and tertiaries is much paler. The two forms are evidently only subspecies and grade completely into one another.

PITTIDÆ.

57. PITTA CYANOPTERA.

Pitta cyanoptera (Temm.); Slater, *tom. cit.*, p. 420; Robinson and Kloss, *tom. cit.*, p. 48.

The commonest of the genus round Ban Kok Klap but not found in very deep jungle. Nestling birds and a clutch of five eggs were obtained, the male bird being shot off the nest, which was a globular mass of dead leaves and rubbish on the ground. The young birds are much duller above and have the scarlet of the abdomen and under tail coverts of the adult birds indicated by salmon pink. The base and tip of the bill are orange red. The eggs were hard set and are obtuse ovals, fairly glossy and yellowish white in colour. Thinly spotted, mainly towards the larger end with small rounded spots of purish brown. They measure, A. 26.1×20 ; B. 25.9×20.2 ; C. 25.8×20 mm.

58. PITTA CUCULLATA.

Pitta cucullata, Hartl.; Slater, *tom. cit.*, p. 442; Robinson and Kloss, *tom. cit.*, p. 49.

Two were obtained at Ban Kok Klap.

59. EUCICHLA GURNEYI.

Eucichla gurneyi, Hume; Slater, *tom. cit.*, p. 448; Robinson and Kloss, *tom. cit.*, p. 49.

Very common indeed in the neighbourhood of Ban Kok Klap but not extending far up the slopes of Kao Nawng as it was not met with at either of our camps on that mountain.

60. EUCICHLA BOSCHI.

Eucichla boschi, Müll. and Schleg.; Slater, *tom. cit.*, p. 447; Robinson and Kloss, *tom. cit.*, p. 49.

Even commoner than *Eu. gurneyi* and extending further up the hill being found at over 2,000 feet elevation.

"Male, iris hazel, bill black, feet lavender in front, pinkish behind."

A nest was found on our way up Kao Nawng at about 700 feet on 10th June, 1913. It was placed in a small sapling about six or seven feet above the ground and consisted of a globular mass of dead leaves and fibre about the size of a man's head. It contained three eggs. They are broad blunt ovals in shape, moderately glossy, white and thickly spotted especially towards the broader end with dark purplish brown spots and streaks, some of the markings being beneath the surface of the shell.

The measurements are : A. 24.2×20.7 , B. 25×21 , C. 25.2×21 mm.

HIRUNDINIDÆ.

61. HIRUNDO BADIA.

Hirundo badia, Cass.; Sharpe, Cat. Birds Brit. Mus., x., p. 166. Robinson and Kloss, tom. cit., p. 50.

Common round the limestone hills in the vicinity of Ban Kok Klap.

MUSCICAPIDÆ.

62. CYORNIS DIALILEMA.

Cyornis dialilema Salvad., Ann. Mus. Civ. Gen., xxvii., p. 387 (1889); Robinson and Kloss, tom. cit., p. 52.

A couple of males in rather shabby plumage appear to be conspecific with specimens from Trang which we have identified with this form which seems to range down the Peninsula as far south as Selangor, where however it is only met with at considerable elevations. I must confess that I am unable to separate with any confidence males of *C. tickellia*, Blyth; *C. sumatrensis*, Sharpe; *C. dialilema*, Salvad.; *C. rubeculoides* (Vig.) and another from allied to *C. nigrigularis*, Everett; all of which occur in the Malay Peninsula, though the first two forms have both sexes closely resembling each other while in the last three the females have no tinge of blue on the plumage.

63. ERYTHROMYIAS MUELLERI.

Erythromyias muelleri (Blyth); Sharpe, tom. cit., p. 200, pl. iv, fig. 2; Robinson Journ. Fed. Malay States Mus., ii, p. 188 (1909).

An adult female and two very young birds were obtained between 12-1500 feet on Kao Nawng.

"Iris dark, bill black, feet pale flesh."

This is the most northerly recorded locality for the species, which is a purely Malayan form, fairly common throughout the Peninsula at medium elevations and also found in Sumatra and Borneo. The adult bird is perfectly typical.

64. ANTHIPES SUBMONILIGER.

Anthipes submoniliger (Hume) ; Stray. Feath., v, p. 105 (1877).

Digenea submoniliger, Sharpe, Cat. Birds Brit. Mus., iv, p. 461 (1879) ; id. P.Z.S. (1888), pp. 246, 7.

This species was common at the top of Kao Nawng at over 4,000 feet and also occurred, though less numerously, at our lower camp.

Comparison of the series obtained with a large number of specimens from the more southern parts of the Peninsula, representing *A. malayana*, Sharpe, enables us to state with certainty that they do not belong to this form but are to be referred to the Tenasserim race, described by Hume from Mt. Muleyit. We have however recently collected in West Sumatra specimens of *A. solitaria* described by Müller in 1835, and comparison of these with skins from the actual type locality of *A. malayana* shows that the two races are absolutely identical as was not unexpected. Sharpe's name for the Peninsular race must therefore be suppressed.

65. ANTHIPES OLIVACEA.

Cyornis olivacea, Hume, Stray. Feath., v, p. 338 (1877) ; id. vi, p. 229 (1878).

Siphia olivacea, Sharpe, Cat. Birds Brit. Mus., iv, p. 457 (1879).

Anthipes olivaceus, Oates, Faun. Brit. Ind. Birds., ii, p. 34 (1890).

Fairly common on the lower slopes of Kao Nawng, also obtained at Trang on the west side of the Peninsula in 1910.

" Iris hazel, bill black, feet pale purplish flesh.

The sexes are alike and the nestling bird has the ordinary mottled plumage characteristic of the flycatchers, the wing coverts broadly tipped with yellowish buff.

I am by no means sure that this species is rightly placed with *Anthipes* by Oates ; except for the comparative feebleness of the rictal bristles and the rather weaker bill it might well be regarded as a *Rhinomyias*, with which genus the type of plumage better accords.

66. HYPOTHYMIS AZUREA.

Hypothymis azurea (Bodd.) ; Sharpe, tom. cit., p. 274 ; Robinson and Kloss, tom. cit., p. 53.

Hypothymis azurea prophata, Oberholser, Proc. U.S. Nat. Mus., xxxix, p. 597 (1911).

We only got one specimen in Bandon and it was not common in Trang.

67. TERPSIPHONE AFFINIS.

Terpsiphone affinis, Blyth ; Sharpe, tom. cit., p. 349 ; Robinson and Kloss, tom. cit., p. 53.

Very common throughout the country.

68. PHILENTOMA VELATUM.

Philentoma velatum (Temm.); Sharpe, tom. cit., p. 365.

A pair from Kao Nawng.

"Male and female, iris crimson, bill and feet black."

69. PHILENTOMA PYRRHOPTERUM.

Philentoma pyrrhopterum (Temm.); Sharpe, tom. cit., p. 366; Robinson and Kloss, tom. cit., p. 53.

More abundant than *Ph. velatum* though in most localities the contrary is the case.

"Male, iris carmine, bill black, feet livid lead grey."

70. CULICICAPA CEYLONENSIS.

Culicicapa ceylonensis (Swains.); Sharpe, tom. cit., p. 369.

Fairly common on Kao Nawng.

"Male, iris dark hazel, upper mandible brown, lower fleshy brown, gape yellow, feet yellowish brown, soles brighter yellow

71. CRYPTOLOPHA YOUNGI, sp. nov.

The only specimen of this very distinct flycatcher was obtained by one of our Dyak collectors on Kao Nawng at about 3,500 feet

It is unfortunately very badly shot and in moult but it is evident that it represents a perfectly good new species, allied to, but readily separable from, *C. castaneiceps* of the Himalayas and Northern Tenasserim and *C. butleri* of the mountains of the southern Malay Peninsula.

Differs from all other members of the group in having the under tail coverts greyish white and the rump clear grey, the bases of the feathers paler.

Adult male. Crown chestnut, bordered by black on each side, sides of the head and lores grey, upper surface dark grey, paler on the rump, the scapulars only tinged with green. Primaries and wing coverts blackish brown, edged with greenish and with two bright yellow bars on the external aspect of the wing formed by the tips of the lesser and greater wing coverts. Under wing coverts and lengthened axillaries bright yellow; whole under surface and under tail coverts pearly grey, whiter on the middle of the abdomen and the under tail coverts; thighs yellowish green. Tail feathers brownish black-edged with greenish. Total length about 3.25, wing 1.9, tail 1.70, tarsus 0.68 inches.

I have named this species after Arthur Young, K.C.M.G., Governor of the Straits Settlements and High Commissioner of the Malay States, to whom I am indebted for permission to collect in Lower Siam and for facilities obtained from the Siamese authorities.

Type and only specimen obtained. Adult male, Kao Nawng, 3,500 feet, Bandon, N.E. Malay Peninsula, 26th June, 1913.

72. ABRORNIS SCHWANERI.

Cryptolopha schwaneri (Blyth.) ; Sharpe, tom. cit., p. 403.

Abrornis schwaneri, Robinson, Journ. Fed. Malay States Mus., ii, p. 191 (1908)

Five specimens from Kao Nawng and Ban Kok Klap are undoubtedly this species, originally described from Borneo, and not the Himalayan *A. superciliaris*, Tickell from the Himalayas down to Tenasserim. Tickell's type, however, came from somewhere in Tenasserim and if as is quite possible his specimen proves to be conspecific with the Bornean bird, his name falls and the birds from Sikkim and the Himalayas will have to be known as *A. flaviventris*, Jerd.

Common throughout the Peninsula especially in bamboo jungle; but not found at low elevations in the south.

" Iris dark brown, bill plumbeous horn, pinkish at tomia and gape, feet brownish flesh.

CAMPOPHAGIDAE.

73. CAMPOPHAGA NEGLECTA.

Campophaga neglecta (Hume) ; Sharpe, Cat. Birds Brit. Mus., iv, p. 68 (1879) ; Robinson and Kloss, tom. cit., p. 54.

Not common.

74. PERICROCOTUS FLAMMIFER.

Pericrocotus flammifer, Hume ; Sharpe, tom. cit., p. 74 ; Robinson and Kloss, tom. cit., p. 54

Very common on Kao Nawng but very wild and hard to obtain.

75. PERICROCOTUS IGNEUS.

Pericrocotus igneus (Blyth) ; Sharpe, tom. cit., p. 78.

A pair from Ban Kok Klap.

PYCNOXOTIDÆ

76. AEGITHINA TIPHIA.

Aegithina tiphia (Linn.) ; Sharpe, Cat. Birds Brit. Mus., vi, p. 7 (1881) ; Robinson and Kloss, tom. cit., p. 55.

A single female.

77. AETHORHYNCHUS LAFRESNAYEI.

Aethorhynchus lafresnayei (Hartl.) ; Sharpe, tom. cit., p. 14 ; Robinson and Kloss, tom. cit., p. 55.

Quite common.

78. CHLOROPSIS CHLOROCEPHALA.

Chloropsis chlorocephala (Wald.) ; Sharpe, tom. cit., p. 28 ; Robinson and Kloss, tom. cit., p. 55.

Common ; the only green bulbul met with in Bandon.

79. IRENA PUELLA.

Irena puella (Lath.); Sharpe, tom. cit., p. 177; Robinson and Kloss, tom. cit., p. 56.

Common on Kao Nawng.

80. HEMIXUS MALACCENSIS.

Hemixus malaccensis (Blyth); Sharpe, tom. cit., p. 52; Robinson and Kloss, tom. cit., p. 56.

A single male from Kao Nawng.

81. IOLE PERACENSIS.

Iole tickelli peracensis, Hartert and Butler, Nov. Zool., v. p. 509 (1898).

A single male, shot on Kao Nawng at about 3,000 feet, is precisely identical with specimens from the typical locality, Gunung Ijau, Larut hills, Perak.

82. CRINIGER SORDIDUS.

Criniger sordidus, Richmond, Proc. U.S. Nat. Mus., xxii, p. 320 (1900); Robinson and Kloss, tom. cit., p. 57.

Two specimens from Kao Nawng, one from over 3,000 feet and another from about 1,200 feet, agree with authentic specimens of this race from Trang, but as we have noticed elsewhere the differences from *C. ochraceus*, Moore, are extremely indefinite. Specimens from Perlis are quite intermediate.

"Iris brownish red, bill plumbeous, paler below, feet plumbeous with pink soles."

83. PYCNONOTUS ROBINSONI

Pycnonotus robinsoni, Ogilvie Grant, Fascic. Malay. Zool., iii, p. 85 (1905). Kloss, Journ. Fed. Malay States Mus., iv, p. 231 (1911).

Pycnonotus blanfordi, Bonhote (nec Jerd.), P.Z.S. 1901 (i), p. 57.

The species also occurs in Trang but was overlooked in the account of the collection from that province: it has also been obtained in the State of Perlis while the Biserat specimen identified by Bonhote as *P. blanfordi* (loc. cit. supra) is almost certainly identical. The species was common in the low country in Bandon province and a pair were obtained at Ban Kok Klap.

84. OTOCOMPSA EMERIA.

Otocompsa jocosa (Linn.); Sharpe, tom. cit., p. 157.

Otocompsa emeria, Robinson and Kloss, tom. cit., p. 58.

Very much rarer in Bandon than in Trang. A single male only was obtained at Ban Kok Klap.

TIMELIIDÆ.

85. EUPETES MACROCERCUS.

Eupetes macrocerus, Temm.; Sharpe, Cat. Birds Brit. Mus., vii, p. 338 (1883).

Fairly common on Kao Nawng, this being the most northerly locality recorded for the species. A ground bird having very much the habits of a Pitta. An adult female and three very young birds were procured. Very young birds are uniform sooty black beneath, except the throat which is white, but the chestnut rufous of the adult soon begins to make its appearance.

"Adult, iris hazel, bill black, feet slate, skin on sides of neck, purplish violet, shading into livid white. Immature, iris hazel, bill black, yellow at gape, feet slate, naked skin at sides of neck, pinkish."

86. TROCHALOPTERUM PENINSULÆ.

Trochalopectum peninsulæ, Sharpe, P.Z.S. 1887, p. 436, pl., xxxvii.

A pair from 3,500 feet on Kao Nawng, agree very closely with specimens from the typical locality except that the crown is very slightly paler, therein showing an approach to *T. melanostigma* which ranges south to Muleyit Mt. and the Salwin river.

87. POMATORHINUS OLIVACEUS.

Pomatorhinus olivaceus, Blyth; Sharpe, Cat. Birds Brit. Mus., vii, p. 414 (1883); Robinson and Kloss, tom. cit., p. 59.

Fairly common on Kao Nawng from about 1,200 feet to the summit of the mountain.

"Iris orange, bill chrome yellow, feet pale grey, soles greenish yellow, claws horn."

88. PELLORNEUM SUBOCHRACEUM.

Pellorneum subochraceum, Swinh.; Sharpe, tom. cit., p. 521; Robinson and Kloss, tom. cit., p. 59.

Fairly common in Bandon, generally in secondary jungle and in patches of scrub at the edge of rice fields.

89. TURDINUS OLIVACEUS.

Malacopteron olivaceum, Strickland, Ann. and Mag. Nat. Hist., xix, p. 132 (1847).

Turdinus abbotti (Blyth); Sharpe, tom. cit., p. 541; Robinson and Kloss, tom. cit., p. 59.

Fairly common. The five specimens before me from Kao Nawng are somewhat brightly coloured beneath, therein approaching the northern race *T. abbotti*, of which this form is only a subspecies.

90. TURDINUS MAGNIROSTRIS.

Turdinus magnirostris (Moore); Sharpe, tom. cit., p. 547.

Common on Kao Nawng.

"Adult, iris red, bill plumbeous grey, slightly yellow on tomia and at gape, feet pale grey, yellowish on toes. Immature, iris hazel grey, feet pale flesh, bill, upper mandible greenish horn, lower waxy yellow, gape bright yellow, orbital skin greenish yellow."

91. DRYMOCATAPHUS NIGRICAPITATUS.

Drymocataphus nigricapitatus (Eyton); Sharpe, tom. cit., p. 554; Robinson and Kloss, tom. cit., p. 60.

Rare; only one specimen was obtained in jungle near Ban Kok Klap.

92. DRYMOCATAPHUS TICKELLI.

Drymocataphus tickelli (Blyth). Sharpe, tom. cit., p. 557; Robinson and Kloss, tom. cit., p. 60.

As elsewhere in the Peninsula very common on Kao Nawng among bamboos.

"Iris chestnut red, feet pinkish flesh, bill plumbeous, darker on upper mandible."

93. CORYTHOICHLA LEUCOSTICTA.

Corythoichla leucosticta, Sharpe, P. Z. S. 1887, p. 438; Robinson and Kloss, tom. cit., p. 61.

This babbler was very common on Kao Nawng, ranging from the foot of the mountain to the summit and also occurred nearly at sea-level at Ban Kok Klap, though in the Federated Malay States it is not found below 2,500 feet.

A series of ten specimens compared with large numbers from more southern localities including the actual type locality of the species show very intangible differences though the ground colour of the upper surface is perhaps rather lighter in the Bandon birds.

Three forms of the genus,* the present one, *C. striata* from Assam and Manipur, and *C. brevicaudata* from Muleyit in Tenasserim are extremely closely related and as might be expected the Malayan race is more closely connected with the Muleyit one with which it agrees in having the tips of the wing coverts white, not fulvous, and the sides of the head ashy not brown. Indeed they are quite possibly identical.

"Iris carmine, tarsi brownish, bill plumbeous horn, darker on culmen."

94. ALCIPPE PHAYZII.

Alcippe phayzii, Blyth; Sharpe, tom. cit., p. 623; Robinson and Kloss, tom. cit., p. 61.

* *C. crassa*, Sharpe, from the mountains of N. Borneo seems rather more distinct.

Almost the commonest bird in the jungle on Kao Nawng, keeping generally to the bushes and smaller trees. We did not obtain it near Ban Kok Klap so that it is evidently a submontane species, replaced in the south of the Peninsula by *A. peracensis*, Sharpe.

"Iris hazel-grey feet dark fleshy brown, bill, upper mandible corneous tip and edges dull yellow, lower mandible more broadly yellow, gape bright yellow, orbital ring greenish waxy yellow.

95. ALCIPPE CINEREA.

Alcippe cinerea, Blyth; Sharpe, tom. cit., p. 622; Robinson and Kloss, tom. cit., p. 61

A pair only from Kao Nawng, where it was rare. The species does not extend into Tenasserim and these specimens are the most northerly recorded.

96. STACHYRIS DAVISONI.

Stachyris davisoni, Sharpe: Bull. B.O.C., i, p. vii. (1892); Robinson and Kloss, tom. cit., p. 61.

A large series from Kao Nawng where it ranges up to about 2,000 feet. Comparison of these birds with numerous specimens from the typical locality (Tahan river, Palang) show that they are identical. *St. nigriceps* (Hodgs), which I had included in the local list on the strength of birds from Trang identified as such Mr. Richmond must therefore be deleted from the Malayan Fauna.

"Iris chestnut hazel, bill plumbeous, darker on culmen, feet greenish lead."

97. STACHYRIDIOPSIS CHRYSOPS.

Stachyris chrysa bocagii, Salvad: Robinson Journ. Fed. Malay States Mus., ii, p. 202.

Stachyris chrysops, Richmond. Proc. Biol. Soc., Washington, xv, p. 157 (1902).

Four specimens of this golden babbler were obtained near the summit of Kao Nawng and must certainly be conspecific with *St. chrysops* obtained in the mountains of Trang, about 80 miles to the south.

At one time I thought that the Malayan form might be identical with the Sumatran race but examination of a series collected on the hills of that island shows that the insular form is a darker and duller form, even darker than *St. assimilis* (Walden) from Assam and Central Tenasserim, especially on the flanks.

Pending direct comparison of series of fresh specimens from the Himalayas, Assam, Tenasserim, Sumatra and the Malay Peninsula, I have thought it best to let the Malayan specimens stand under Richmond's name though it is evident that *St. chrysa* (Hodgs); *St. assimilis* (Walden); *St. bocagii*, Salvad and *St. chrysops*, Richm are all but slightly differentiated subspecies.

98. THRINGORHINA GUTTATA.

Stachyris guttata (Tick.); Sharpe, tom. cit., p. 535.

Thringorhina guttata, Oates, Faun. Brit. Ind. Birds, i, p. 155 (1889).

Tickell's spotted babbler was very common on Kao Nawng keeping to bushes and low trees in parties of two or three. It has also been obtained in the West Coast State of Trang by Dr. W. L. Abbott but has not yet been met with further south in the Peninsula.

" Iris chestnut, bill slate, darker on culmen, feet greenish.

99. CYANODERMA ERYTHROPTERUM.

Mizornis erythroptera (Blyth); Sharpe, tom. cit., p. 580.

Cyanoderma erythropteron, Robinson and Kloss, tom. cit., p. 62.

A single male from Ban Kok Klap.

100. CHALCOPARIA PHAENICOTIS.

Anthothreptes phenicotis (Temm.); Gadow, Cat. Birds Brit. Mus., ix, p. 121 (1881).

Chalcoparia phenicotis (Temm.); Oates, Faun. Brit. Ind. Birds, ii, p. 373 (1890).

A single female from Ban Kok Klap.

It is, I think, obvious as Oates (*loc. cit.*) has pointed out that this bird is misplaced among the *Nectariniidae* and that its proper position is somewhere among the *Timeliidae*.

* 101. MIXORNIS GULARIS.

Mizornis gularis (Raffles); Sharpe, tom. cit., p. 576; Robinson and Kloss, tom. cit., p. 62.

Four specimens from Kao Nawng and others from Trang, Terutau and Perlis are not typical *M. gularis* but are intermediate between that species and *M. rubricapilla*. They resemble the latter in having the mantle and external aspect of the primaries more olive and less chestnut and the former in the broadness of the black streaks on the throat and upper breast.

102. BRACHYPTERYX WRAYI.

Brachypteryx wrayi, Ogilvie Grant, Bull. B.O.C., xix, p. 10 (1906); id. Journ. Fed. Malay States Mus., iii, p. 26 (1908).

A male and a female from 4,000 feet, Kao Nawng, both of which are in the brown plumage agree precisely with others from Gunong Tahan and from the main peninsular range in Perak and Selangor.

103. SIVA SORDIDIOR.

Siva sordidior, Sharpe, P.Z.S. 1888, p. 276.

Five specimens from about 3,000 feet on Kao Nawng are in such faded and abraded plumage that their identification is a matter of some

uncertainty. They appear, however, to belong to this form and not to the more northern *S. sordida*, Hume, which is found on Mt. Muleyit in Central Tenasserim.

104. *HERPORNIS ZANTHOLEUCA*.

Herpornis zantholeuca (Hodgs.); Sharpe, tom. cit., p. 636; Robinson and Kloss, tom. cit., p. 63.

Eleven skins from the lower slopes of Kao Nawng, where it was one of the commonest birds.

105. *PTERYTHIUS AERALATUS*.

Pterythius aeralatus (Tick.); Gadow, Cat. Birds Brit. Mus., viii, p. 114 (1883); Oates Faun. Brit. Ind. Birds, i, p. 225 (1889).

A very common species above 2,000 feet on Kao Nawng.

"Iris chestnut, bill black on culmen, remainder plumbeous, feet pale flesh, claws dark."

106. *MESIA ARGENTAVRIS*.

Mesia argentauris (Hodgs.); Sharpe, tom. cit., p. 642.

Apparently quite common above 3,000 feet: five specimens were obtained by the Dyaks in the vicinity of the upper camp on Kao Nawng.

TROGLODYTIDÆ.

107. *PNOPYGGA PUSILLA*.

Pnopygga pusilla, Hodgs.; Sharpe, Cat. Birds Brit. Mus., vi, p. 304 (1881).

A pair of hill-wrens from near the summit of Kao Nawng at about 4,000 feet differ from others from the southern parts of the Peninsula, of which the Museum possesses a large series in being rather duller above and in having the lower surface much less strongly squamate. They are probably referable to the above-named species, which has been found as far south as Muleyit Mountain in Central Tenasserim, while the southern Malayan specimens have been identified with *Pn. lepida*, Salvad. from the mountains of Sumatra.

TURDIDÆ.

108. *HYDROCICHLA RUFI CAPILLA*.

Hydrocichla ruficapilla (Temm.); Sharpe, Cat. Birds Brit. Mus., vii, p. 319 (1885).

Very common along the rocky streams on Kao Nawng.

"Iris chestnut, bill black, feet pale lilac flesh."

109. *HYDROCICHLA FRONTALIS*.

Hydrocichla frontalis (Blyth); Sharpe, Cat. Birds Brit. Mus., vii, p. 321 (1885); Robinson and Kloss, tom. cit., p. 64.

On Kao Nawng, but much rarer than the preceding.

110. CITTOCINCLA MACRURA.

Cittocincla tricolor (Vieill.) ; Sharpe, tom. cit., p. 85.

Cittocincla macrura (Gm.) ; Robinson and Kloss, tom. cit., p. 65.

Very common.

SYLVIIDÆ.

111. ORTHOTOMUS RUFICEPS.

Orthotomus ruficeps (Less.) ; Sharpe, Cat. Birds Brit. Mus., vii, p. 224 (1883) ; Robinson and Kloss, tom. cit., p. 66.

We obtained five specimens of this tailor-bird near Ban Kok Klap, this being the only place in the Peninsula, where we have found it at all abundant.

112. ORTHOTOMUS ATRIGULARIS.

Orthotomus atrigularis, Temm. ; Sharpe, tom. cit., p. 220 ; Robinson and Kloss, tom. cit., p. 66.

An immature male from Kao Nawng.

LANIIDÆ.

113. HEMIPUS PICATUS.

Hemipus picatus (Sykes) ; Sharpe, Cat. Birds Brit. Mus., iii, p. 307 (1877) ; Robinson and Kloss, tom. cit., p. 69.

Four specimens from Kao Nawng and Ban Kok Klap.

114. TEPHRODORNIS GULARIS.

Tephrodornis gularis (Raffles) ; Sharpe, tom. cit., p. 278 ; Robinson and Kloss, tom. cit., p. 69.

A male from Kao Nawng and a female from Ban Kok Klap.

These specimens are typical *T. gularis* and Oates statement that the allied *T. pelvicius* extends southwards down the Malay Peninsula (Faun. Brit. Ind. Birds., i, p. 474) appears to have no foundation in fact.

115. PLATYSMURUS LEUCOPTERUS.

Platysmurus leucopterus (Temm.) ; Sharpe, tom. cit., p. 90 ; Robinson and Kloss, tom. cit., p. 71.

This noisy bird was very numerous in secondary jungle at Ban Kok Klap.

PARIDÆ.

116. MELANOCHLORA FLAVOCRISTATA.

Melanochlora flavocristata (Lafr.) ; Hellmayr, Tierreich, Paridæ, p. 31 (1903) ; Robinson and Kloss, tom. cit., p. 70.

Melanochlora sultanea (part.) ; Gadow, Cat. Birds Brit. Mus., viii, p. 6 (1883).

Fairly common on Kao Nawng and on the foot hills at the base of the mountain.

Four males were obtained.

" Iris hazel, bill black, feet bluish with a greenish cast."

SITTIDÆ.

117. DENDROPHILA SATURATION.

Sitta frontalis saturator, Hartert, Nov. Zool., ix, p. 573 (1902).

Dendrophila saturator, Robinson and Kloss, tom. cit., p. 70.

A single male, rather pale beneath, like others from Trang but probably referable to this form and not to *D. frontalis*.

118. PLATYLOPHUS ARDESIACUS.

Platylophus ardesiacus (Cab.) : Sharpe, tom. cit., p. 278; Robinson and Kloss, p. 69.

Kao Nawng and Ban Kok Klap.

"Male, iris chestnut red, bill and feet black."

DICRURIDÆ.

119. DISSEMMURUS PARADISEUS.

Dissemurus paradiseus (Linn.) : Sharpe, tom. cit., p. 225; Robinson and Kloss, tom. cit., p. 71.

Common everywhere; the only drongo seen.

NECTARINIIDÆ.

120. ÆTHOPYGA SANGUINEPECTUS.

Æthopyga sanguinepectus, Wald., Gadow, Cat. Birds Brit. Mus., ix, p. 27 (1884).

Between the upper camp on Kao Nawng (3,050 feet) and the summit of the mountain (4,200 feet) our Dyak collectors obtained six males and a female of this very beautiful sunbird. The present locality is a very considerable extension of range for the species, which has not hitherto been obtained south of Muleyit mountain in Central Tenasserim. No other sunbirds of this genus were obtained though one species, *Æthopyga anomala*, allied to *Æ. saturata* of the eastern Himalayas and *Æ. wrayi* of the mountains of the southern Malay Peninsula has been described from the collections made by Dr. Abbott in the mountains of Trang but a little to the south of the present locality.

121. ARACHNOTHERA LONGIROSTRIS.

Arachnothera longirostris (Lath.) ; Gadow, tom. cit., p. 103; Robinson and Kloss, tom. cit., p. 77.

One female from Ban Kok Klap.

122. ARACHNOTHERA MODESTA.

Arachnothera modesta (Eyton) ; Gadow, tom. cit., p. 107; Robinson and Kloss, tom. cit., p. 77.

One female from 3,500 feet on Kao Nawng.

123. ARACHNOTHERA CHRYSOGENYS.

Arachnothera chrysogenys (Temm.); Gadow, tom. cit., p. 108; Robinson and Kloss, tom. cit., p. 77.

A male from the lower camp on Kao Nawng, about 1,200 feet. Nowhere common.

124. ANTHOTHREPTES HYPOGRAMMICA.

Anthothreptes hypogrammica (S. Müll.); Gadow, tom. cit., p. 112; Robinson and Kloss, tom. cit., p. 76.

A single much damaged specimen from Kao Nawng, where it was rare.

DICÆIDÆ.

125. DICÆUM TRIGONOSTIGMA.

Dicæum trigonostigma (Scop.); Sharpe, Cat. Birds Brit. Mus., x, p. 38; Robinson and Kloss, p. 78.

Common nearly everywhere.

126. PRIONOCHILUS MACULATUS.

Prionochilus maculatus (Temm.); Sharpe, tom. cit., p. 69; Robinson and Kloss, tom. cit., p. 32.

Two males from Kao Nawng.

"Iris dark, bill plumbeous, feet pale plumbeous.

ZOSTEROPIDÆ.

127. ZOSTEROPS TAHANENSIS.

Zosterops tahanensis, Ogilvie Grant; Bull. B.O.C., xix, p. 10 (1906); Robinson and Kloss, tom. cit., p. 79.

Three males from near the summit of Kao Nawng, agreeing well with other specimens from Trang and the mountains of Selangor.

ON A COLLECTION OF MAMMALS FROM THE SIAMESE PROVINCE OF BANDON, N.E. MALAY PENINSULA.

By H. C. ROBINSON, C.M.Z.S., M.B.O.U. AND C. B. KLOSS, F.Z.S.

THE collection of mammals obtained in Bandon is fairly representative of the fauna of the district and contains a considerable number of specimens that throw light on the local distribution of Malayan mammals.

A preliminary account of the forms considered new to science has already appeared in the "Annals and Magazine of Natural History, ser. (8) xiii, pp. 223 et seqq. (1914) but in addition to these another race, *Sciurus tenuis gunong*, has been described in the present paper, while two other species, the bat, *Eptesicus pachyotis*, and the ground squirrel, *Menetes berdmorei*, have not hitherto been recorded from Peninsular limits.

As regards the general facies of the collection it may be stated that the evidence shows that the district lies on the extreme limit of the true Malayan fauna, certain forms such as *Sciurus rittatus minutus*, *Sciurus hippurus* and *Rhinosciurus tupaionides* here exhibiting their furthest northern extension while other species such as *Sciurus erythræus rubeculus*, and *Epimys orbus* indicate an admixture of Burmese races.

A general account of the collecting stations has already been given in the account of the Birds (*antea*, pp. 83-5) to which it is unnecessary to refer further.

1. HYLOBATES LAR (LINN.).

1 ♂. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet.

An example from mountain jungle on Kao Nawng is in light pelage, the hands and feet only slightly contrasting with the colour of the limbs. Dark coloured specimens seem very rare in the northern parts of the Peninsula, though they are in the great majority in the central and southern parts.

Not at all common over the greater part of Bandon, but fairly numerous on a small hill a few miles from the town. The flesh is in great demand as a remedy for a variety of complaints as is that of *Presbytis robinsoni* and *P. neglecta keatii*, though curiously enough that of *P. obscura* is of no value for this purpose.

(For measurements see p. 113.)

2. PRESBYTIS NEGLECTA KEATII. ROB. & KLOSS.

Presbytis neglecta keatii, *Robinson and Kloss, Journ. Fed. Malay States*, iv, p. 174 (1911).

1 ♂, 1 ♀. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet.

Agree with topotypes from Trang except that the white area appear to be somewhat reduced, that on the inner side of the thigh not extending as far as the heel.

Very common in parties of five or six in primary and secondary jungle round Kao Nawng, but not coming into villages or cultivated land.

In a recent paper (*Smithsonian Misc. Coll.*, vol. 61, No. 21, p. 28, 1913), G. S. Miller has restricted the name *P. femoralis*, at one time applied to monkeys of this type, ranging from Tenasserim, through the Malay Peninsula to Sumatra and Borneo, to the form inhabiting Singapore Island, though some ambiguity attaches to the real origin of Martin's type.

In view of this we have preferred to use the name *Presbytis neglecta* (Schlegel) (*Mus. Pays. Bas.*, vii, p. 47, 1876) for the animal from Singapore and to regard this as the primary name available for the Peninsular animals.

In the same paper Miller has also given a diagnosis of a new race from Johore, stating that it is similar to that from Singapore Island but is larger than that form, having the greatest length of skull, about 95 mm. His description is founded on five specimens, four from Johore and one from Southern Pahang. A male specimen from Singapore in the Federated Malay States Museum has the greatest skull length 89.3 mm., two specimens in the British Museum from Pulau, South Johore measure 89.9 and 86.3 respectively, and a male and a female from Segamat, North Johore, are 88.5 and 86.5 respectively, while the length given by Miller for his specimen from Singapore is 88.3.

Of the northern race *P. n. keatii*, five males range from 92 to 96.7 and four females from 92.4 to 97.0 mm. It is evident therefore that the series in our possession does not confirm Miller's conclusions as to the separability of animals from Johore and Singapore, though there is no doubt that the northern race is distinct from these both in size and colour.

(For measurements see p. 113.)

3. PRESBYTIS ROBINSONI, THOMAS.

Presbytis robinsoni, *Thos., Abstract, P.Z.S.* 1910, p. 25; *id. P.Z.S.* 1910, p. 635.

♂. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet.

The adult agrees closely with the type from Trang.

This white lotong is common on Kao Nawng where it is almost always found associating with small parties of the preceding form, of which it is very probably an aberration. It may be remarked that all three specimens known to date present abnormalities in the structure and character of the hair, the patches of pigment being irregularly distributed through them, while the unpigmented

portions are narrowed in diameter. The skull presents no differences whatever from those of *P. n. keatii*, with which we have compared it.

(For measurements *see* below.)

4. PRESBYTIS OBSCURA, SUBSP. (N).

♂ imm. Ban Kok Klap, Bandon, N.E. Malay Peninsula. 2nd July, 1913.

An immature male (greatest cranial length 83.6 mm.) differs from normal adults in being of a pale café-au-lait colour; the occiput, nape, median dorsal line and middle areas of the limbs being creamy to light buff with the forehead sides of the face and neck, chest, shoulders, sides of body, hands and feet, pale snuff brown. At a casual glance this specimen might be referred to the preceding race, from which however it can at once be distinguished by the arrangement of the hair on the forehead.

A form of *Pr. obscura* was common in the district, though we did not collect other specimens.

Measurements of monkeys from Bandon Province, N.E. Malay Peninsula:

Species.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind foot.	Ear.	Greatest length of skull.	Basal length.	Zygomastic breadth.	Mandibular tooth-row.
<i>Hylobates lar</i>	Kao Nawng	550 13	Male	453		152	31	191.2	74	69.5	32.3
<i>Presbytis neglecta keatii</i>	"	547 13	"	482	699	164	35	93	61	70	30
"	"	546 13	Fem	473	677	162	32	92.7	62	71.5	30
<i>Presbytis robinsoni</i>	"	549 13	Male	495	752	171	32	97.5	64.5	70	30.7

5. PAGUMA LEUCOMYSTAX ROBUSTUS (MILLER).

Paradoxurus robustus, Miller, *Proc. Biol. Soc. Washington*, xix, p. 26 (1906).

♂ imm. Ban Kok Klap, Bandon, N.E. Malay Peninsula. 30th June, 1913.

A young specimen with the milk dentition partly in place.

6. TUPAIA GLIS WILKINSONI. ROBIN. & KLOSS.

Tupaia ferruginea subsp. wilkinsoni, Robinson and Kloss, *Journ. Fed. Malay States Mus.*, iv, p. 173 (1911).

Tupaia lacernata subsp. wilkinsoni, Lyon, *Proc. U.S. Nat. Mus.*, 45, p. 52 (1913).

1 ♂ ad, 1 ♀ ad, 1 ♂ imm, 1 ♀ imm. Kao Nawng, Bandon, N.E. Malay Peninsula, 2,500 feet. June. 1913.

2 ♂ ad, 2 ♀ ad. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet. June, 1913.

3 ♂ ad, 4 ♀ ad. Ban Kok Klap, Bandon, N.E. Malay Peninsula. June, July, 1913.

These specimens are not altogether typical *T. g. wilkinsoni*, a number of the series having shoulders almost approximating in ferruginous tint to many animals of the *ferruginea* race from the

Federated Malay States. It is possible that the latter form is slower to change on the east side of the Peninsula than on the west.

Several of the specimens from the lower altitudes have the long black piles on the rump very abundant forming a conspicuous shining patch but this occurs also, though more rarely in other races.

(For measurements *see* below.)

Measurements of *Tupaia* from Bandon Province, N.E. Malay Peninsula:

Species.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind foot.	Ear.	Greatest length of skull.	Greatest cranial breadth.	Tip of premaxillaries to lacrymal notch.
<i>Tupaia glis wilkinsoni</i>	Kao Nawng	271/13	Fem.	188	162	43.5	16	52.8	26.0	23.0
"	Ban Kok Klap	273/13	Male	178	157	42.5	17	51.7	26.0	22.5
"	"	274/13	Fem.	172	154	43.5	16	51.2	25.0	22.4
"	"	275/13	"	178	154	40	18	50.0	24.8	21.5
"	"	276/13	"	177	158	41	14	50.7	24.3	22.4
"	"	277/13	"	184	162	43	17.5	51.0	24.4	22.1
"	Kao Nawng	278/13	Male	165	165	40	21	49.3	25.8	21.1
"	"	279/13	Fem.	175	165	45	15	50.4	25.5	21.7
"	Ban Kok Klap	388/13	Male	179	158	41	15	51.0	25.1	22.4
"	Kao Nawng	392/13	"	174	156	42.7	17	...	...	21.8
"	"	442/13	"	154	148	42.5	16.5	51.1	25.8	21.9
"	Ban Kok Klap	443/13	Fem.	180	160	43.5	16	49.0	25.2	20.8

7. GALEOPTERUS TEMMINCKI PENINSULÆ. THOS.

Galeopterus peninsulæ, *Thos., Ann. and Mag. Nat. Hist.* (8) ii, p. 303 (1908).

♀. Ban Kok Klap, Bandon, N.E. Malay Peninsula. 1st July, 1913.

A female in grey pelage agreeing with others of the sex from the south of the Malay Peninsula.

Head and body, 399; tail, 277; hind foot, 71; ear, 23.

Skull.—Condylar-basal length, 73; greatest breadth, 48.3; interorbital breadth, 20; palatal length, 34.3; maxillary tooth-row 37.4; three molars, 10.9.

8. CYNOPTERUS BRACHYOTIS ANGULATUS. MILLER.

Cynopterus angulatus, *Miller, Proc. Acad. Nat. Sci., Philadelphia*, p. 316 (1898).

Cynopterus brachyotis angulatus, *Andersen, Cat. Chir. Brit. Mus.*, (2nd ed.), p. 611 (1912).

1 ♂ 3 ♀ ad. Ban Kok Klap, Bandon, N.E. Malay Peninsula. 30th June, 1913.

It is stated by Andersen (*loc. cit.*, p. 609) that the relatively smaller ears (13-18 mm.) are the only characters by which the races of *C. brachyotis* can be distinguished from those of *C. sphinx* (18-20 mm.). The above four specimens have the ear averaging 19.6 measured in the flesh and 17 mm. when dry. From the balance of other measurements it must however be considered that these examples are still within the dimensions which indicate inclusion in *C. b. angulatus*, but at the same time they appear to be of greater size than more southern specimens and point to the conclusion that in the locality of Bandon *C. brachyotis* is commencing to intergrade with *C. sphinx*. It would perhaps be more logical to regard *C. angulatus* as a sub-species of the latter rather than the former species.

Measurements of *Cynopterus brachyotis angulatus* from Bandon Province, N. E. Malay Peninsula:

S. M. No	363 13	364 13	365-13	366 13
Sex ..				
Head and body ..	92	91	93	97
Tail ..	11	11	12	12
Hind foot ..	13.5	13	11	13.5
Ear ..	20.5	19.5	19.5	19
Fore-arm ..	67	63	65	70.5
3rd Metacarpal ..	44.5	42.5	43	44
III' ..	28.5	26.2	26.2	29
Tibia ..	26	24.2	25.2	26
Greatest length of skull ..	31.4	30.7	31.5	31.0
Condylar-basal length ..	29.8	29.1	29.6	29.0
Zygomatic breadth ..	21.0	20.5	20.5	21.6
Rostrum ..	8.3	8.0	8.0	—
Mandible ..	24.6	23.2	24.7	24.6
C-m. 'crowns ..	10.3	10.5	10.6	10.5

9. EMBALLONURA PENINSULARIS, MILLER.

4 ♂, 2 ♀. Kao Nawng, Bandon, N. E. Malay Peninsula, 1,400 feet June, 1913.

(For measurements see below.)

Measurements of *Emballonura peninsularis* from Bandon Province, N. E. Malay Peninsula.

S. M. No.	523/13	524/13	525/13	526/13	528/13	562/13	563/13
Sex ..	♂	♂	♀	♂	♀	♂	♂
Head and body ..	42	44	41	43	42	41	44
Tail ..	13	11	13.3	15	15	14	13.7
Tibia ..	17.5	18.4	17	17.2	18	17	16.1
Hind foot ..	6.6	7.5	6.8	6.6	6.0	7.0	7.0
Fore-arm ..	45	46	44	45	44.5	45.5	44
3rd Metacarpal ..	38.3	40.8	40.2	41	41	40	—
Greatest length of skull ..	14.9	14.5	14.6	14.6	14.3	14.4	—
Greatest ante-orbital breadth ..	—	5.5	5.6	5.8	5.6	5.4	—
Least inter-orbital breadth ..	2.8	2.8	2.8	3.0	2.9	3.0	3.0
Zygomatic breadth ..	8.5	—	8.6	8.7	8.9	8.7	8.7
Cranial breadth ..	7.0	7.2	7.0	7.0	7.2	7.0	7.1
Mastoid breadth ..	7.7	7.8	7.7	7.7	7.9	7.7	—

10. MYOTIS MURICOLA (TRMM.).

1 ♂. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet. June, 1913.

Head and body, 44; tail, 34.5; hind foot, 6.6; ear, 12.5; tibia, 15.5; fore-arm, 35; inter-orbital breadth, 3.6; greatest cranial breadth, 6.9; maxillary tooth row, 5.5; mandibular tooth row, 6.0; mandible, 10.8 mm.

11. HESPEROPTENUS BLANFORDI (DOBSON).

1 ♂. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet. June, 1913.

Inter-orbital breadth, 4.5; greatest cranial breadth, 6.0; maxillary tooth row, 4.1; mandibular tooth row, 4.6; mandible, 8.4 mm.

12. EPTESICUS PACHYOTIS (DOBSON).

Vesperugo pachyotis, Dobson, *Journ. Asiat. Soc. Bengal*, p. 211 (1871); *id. Cat. Asiat. Chir.*, p. 104 (1876); *Blanford, Faun. Brit. Ind.*, p. 30 (1888).

1 ♀. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet. June, 1913.

The types from the Khasia Hills, Assam, seem to have remained unique until the present specimen was obtained and the genus has not hitherto been recorded from the Malayan region.

Head and body \pm 59; tail, 41; hind foot, 10; ear, 15.5; tibia, 15.3; fore-arm, 41.5 mm.

Skull.—Condylar-basal length \pm 15.9; palatilar length, 7.9; maxillary tooth row, 6.1; mandibular tooth row, 6.8; mandible, 13.2 mm.

13. RHINOLOPHUS BORNEENSIS. (?)

1 ♀. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet. June, 1913.

A single specimen of a leaf-nosed bat belonging to this genus does not agree with the diagnosis of any form hitherto recorded from the Malay Peninsula. From its dimensions it would appear to come closest to *R. b. spadix*, Miller, from the Natunas and Karimata Islands.

Ears, length, 18.0; fore-arm, 45.0; 3rd metacarpal, 33.0; III¹, 14.5; III², 20.0; 4th metacarpal, 34.3; IV¹, 11.2; IV², 13.0; 5th metacarpal, 34.3; V¹, 11.7; V², 12.5; tail, 23.5; lower leg, 18.5; foot with claws, 9.0 mm.

Skull.—Greatest length, 19.3; mastoid width, 9.4; cranial width, 8.44; zygomatic width, 10.0; supra-orbital length, 5.4; breadth of nasal swellings, 5.3. Mandible, 13.0; upper teeth, 7.4; lower teeth, 7.7 mm.

14. CELOPS ROBINSONI, BONH.

Bonhote, Journ. Fed. Malay States Mus., iii, p. 4 (1908).

1 ♂, 1 ♀. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet. June, 1913.

Captured in tent at night. The locality of the type (only specimen known hitherto) is the foot of Gunong Tahan, Pahang.

¹ Male example. ² Female example.

Head and body $\pm 40^1$, 37.5^2 ; fore-arm, 40.5, 38.2; tibia, 14.6, 15.3; ear, 11.5, 12.5. Front of canines to post-occipital extremity, 16.5, 16.1; occipito-sinual length, 13.3, 12.9; cranial length, 10.0, 10.1; cranial breadth, 7.9, 7.6; zygomatic breadth 7.0, 6.8; greatest rostral breadth, 4.0, 3.9; palatilar length, 6.2, 6.0; maxillary tooth row, 5.8, 5.7; mandibular tooth row, 6.1, 5.9; mandible, 9.6, 9.3 mm.

15. PETASTURISTA NITIDA CICUR. ROSE & KLOSS.

Robinson and Kloss, Ann. Mag. Nat. Hist. (8) xiii, p. 223 (1914).

8 ♂, 1 ♀. Ban Kok Klap, Bandon, N.E. Malay Peninsula. June, July, 1913.

The large series of this flying squirrel obtained are quite constant in the characters which differentiate the form from *P. n. melanotus* from the remaining parts of the Peninsula.

The colour is rich chestnut not bay and the hairs of the back have marked black tips. The black on the hands and feet and round the ears is more extensive and the postorbital processes of the skull are longer and broader than in the southern race.

Very common in the orchards round Ban Kok Klap, feeding on the durian trees the fruit of which was just ripening at the time of our visit.

No less than five specimens were shot on one tree within half an hour. All the specimens appeared to be rutting.

It is curious that this district should produce so distinct a form of flying squirrel, the more so as individuals from Trang a hundred miles to the south belong to *P. n. melanotus* as do also skins collected by Finlayson and ascribed to Bangkok, though this locality is open to doubt.

(For measurements see p. 123.)

16. RATUFA MELANOPEPLA PENINSULAE, MILLER

Ratufa melanopepla peninsulæ, Miller, *Smithsonian Misc. Coll.* 61, No. 21, p. 25 (1913).

♀. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet. June, 1913.

♀. Ban Kok Klap, Bandon, N.E. Malay Peninsula. July, 1913.

Not particularly common at either station.

Agree in dimensions with *R. m. peninsulæ* from Trang, in no way approaching in size *Ratufa phaeopepla*,³ Miller, from Southern Tenasserim. A re-examination of the twelve specimens forming the type series of *R. melanopepla* originally stated to have come from Trang shows that the type and three other individuals which differ noticeably from the remainder were taken on Telihon Island off the coast; the name *R. melanopepla* must therefore be restricted to specimens from that locality while mainland animals from Bandon southwards will be known as above. In colour they do not differ from the form from the adjacent islands but are larger.

(For measurements see p. 123.)

¹ Male example. ² Female example. ³ Miller, *Smithsonian Misc. Coll.*, vo. 61, No. 21, p. 25. ⁴ Miller loc. cit.

17. *SCIURUS ERYTHRÆUS RUBECULUS*, MILLER.

Sciurus rubeculus, Miller, *Smithsonian Misc. Coll.*, vol. 45, p. 22 (1903).

7 ♂, 1 ♀. Kao Nawng, Bandon, S.W. Siam, 3,500 feet. 24-26th June, 1913.

The eight specimens enumerated above, all collected within a few hundred yards of each other and in a period of three days, are in very variable pelage, ranging from an individual in which the whole under surface, except a narrow median line and the chin and throat, is mahogany red to one in which the latter colour is merely represented by two faint lateral streaks on the belly, all the hairs of which are otherwise annulated. The disappearance of the mahogany red is also correlated with a reduction in the intensity of the buffy orange suffusion on the upper surface and with a darkening of the tail, in which the black annulations become more predominant. The changes are obviously seasonal and not individual, the same mutations being observed in the race from Formosa, the names *Sc. thaiwanensis*, *Sc. th. centralis* and *Sc. th. roberti* having been founded on them by Bonhote (*Ann. Mag. Nat. Hist.* (7) vii, pp. 165,166) the latter two of which will have to be suppressed.

The form from the mountains of the central part of the Malay Peninsula, *Sc. erythræus youngi* [*Ann. Mag. Nat. Hist.* (8) xiii, p. 224 (1914)] has good claims to subspecific separation. It is decidedly duller in colour, distinctly smaller and, as the very large series in the Federated Malay States Museums shows, has no seasonal change of pelage.

(For measurements *see* p. 123.)

18. *SCIURUS HIPPIURUS*, IS. GEOFFR.

1 ♂, 1 ♀. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet. June, 1913.

Agreeing exactly with specimens from other parts of the Malay Peninsula. The present locality is the most northerly on record, the species not being yet known from Tenasserim.

(For measurements *see* p. 123.)

19. *SCIURUS CONCOLOR MILLERI*, ROB. & WROUGHTON.

Sciurus epomophorus milleri, Robinson and Wroughton, *Journ. Fed. Malay States Mus.*, iv, p. 233 (1911).

3 ♂, 5 ♀. Ban Kok Klap, Bandon, N.E. Malay Peninsula. June, July, 1913.

Very common in kampong land.

These squirrels belong to the section of the species with a clear black tail tip, and with brighter colour patches on the shoulders and thighs, though in some specimens these are not very obvious.

They are very distinct from the southern *Sc. concolor* and from the island forms *Sc. c. epomophorus* and related races but they are

not very clearly defined from *Sc. c. davisoni* from Tavoy and Southern Tenasserim. They can be exactly matched by topotypes of *Sc. c. milleri* from Trang, collected in December.

(For measurements see p. 123.)

20. *SCIURUS VITTATUS MINIATUS*.

Sciurus notatus miniatus, Miller. *Proc. Acad. Sci. Washington*, ii, p. 79 (1900).

2 ♂, 3 ♀. Kao Nawng, 1,200-1,500 feet. 15-26th June, 1913.

The above series agree closely with topotypes from Trang from which the present locality, which is the most northerly recorded for the race, is geographically not far removed.

As noted elsewhere * this squirrel, which in the Western Malay States is largely a denizen of cultivated land, is in the north-east of the Peninsula strictly a jungle haunting species, having been displaced from the villages and orchards by the local forms of *Sc. concolor*, a larger and heavier animal. In the jungle on Kao Nawng it was by no means common.

(For measurements see p. 123.)

21. *SCIURUS TENUIS SURDUS* MILLER.

Sciurus tenuis surdus, Miller, *Proc. Acad. Sci. Washington*, ii, p. 80 (1900).

2 ♂. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet. June, 1913.

2 ♀. Do. do. 3,500 feet. June, 1913.

Quite identical with topotypes from Trang.

Sciurus tenuis appears to be peculiarly sensitive to the influence of elevation. The mountain form of the race occurring in Borneo is different from that found in the lowlands and the same is the case with Sumatran specimens, while *Sc. t. tahan* from the mountains of the Malay Peninsula is very distinct from the typical form, found on the lower slopes of the same hills.

(For measurements see p. 123.)

22. *SCIURUS TENUIS GUNONG*, *subsp. nov.*

A mountain form of *Sciurus tenuis*, differing from *Sciurus tenuis surdus* † Miller from Trang in its larger size, darker upper surface and buffy washed lower parts. Separable from *Sciurus tenuis tahan*, Bonhote ‡ by its smaller size, slightly paler upper parts and by the absence of the rich buffy suffusion on the inner side of thighs and the inguinal region.

* Fascic. Malay, Zool. I, p. 22 (1903). † Miller, loc. cit. supra. ‡ Bonhote Journ. Fed. Malay States Mus. III, p. 6 (1909).

MEASUREMENTS.—Collector's external measurements (taken in the flesh):

Head and body, 140 (160) mm.; tail, 122 (137); hind foot, 33 (38); ear, 12 (15).

Skull.—Greatest length, 40.0 (43.8); condylo-basilar length, 33.0 (36.0); inter-orbital breadth, 12.7 (13.8); zygomatic breadth, 23.0 (24.7); cranial breadth 19.0 (20.0); median length of nasals, 10.8 (12.0); distema, 8.9 (10.1); upper molar series including mm.³ 7.2 (8.3) mm.

SPECIMENS EXAMINED.—Five, from the type locality.

(For measurements see p. 124.)

TYPE.—Adult male (skin and skull) No. 129/13, Federated Malay States Museum, collected on Kao Nawng, Bandon, S. W. Siam, 3,500 feet. By H. C. Robinson and E. Seimund, 25 June, 1913. Original No. 5656.

Measurements in parentheses are those of an adult male *Sciurus tenuis tahan* from the Teku Plateau, Gunung Tahan, Pahang, Federated Malay States Museum, No. 1833/11.

23. *SCIURUS ROBINSONI*. BONN.

Sciurus robinsoni, *Bonhote, Fascic. Malay. Zool.* III. p. 24, pl. 1 (1903).

1 ♀. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet. 27th June, 1914.

The large series* of the reputed southern form, *Sc. robinsoni alacris*, Thos. now available shows that the differential characters relied on are by no means constant.

(For measurements see p. 124.)

24. *TAMIOPS MACCLELLANDI NOVENLINEATUS*. MILLER.

Sciurus novemlineatus, *Miller, Proc. Biol. Soc. Washington*, xvi, p. 147 (1903).

3 ♂, 2 ♀. Ban Kok Klap, Bandon, N.E. Malay Peninsula. June, July, 1913.

Do not differ from topotypes from Trang.

In the Federated Malay States this squirrel is strictly a mountain form but in Bandon it was quite common at low elevations.

(For measurements see p. 124.)

25. *LARISCUS INSIGNIS* subsp. *JALORENSIS*. BONN.

Funambulus peninsulæ, *Miller, Smiths. Misc. Coll.*, vol. 45, p. 25 (1903).

1 ♂ ad. Kao Nawng, Bandon, N.E. Malay Peninsula. 3,500 feet. June, 1913.

2 ♂ ad., ♀ ad. Do. do. 1,200-1,500 feet. June, 1913.

The above series, which are all old animals, confirms the statement already made elsewhere, that with the exception of examples from the extreme south of Johore and from Singapore Island no constant difference exists between specimens of this genus from the extreme north of its range and from the remainder of the Malay Peninsula.

(For measurements see p. 124.)

26. MENETES BERDMOREI. BLYTH

cf. *Thomas, Journ. Nat. Hist. Soc. Bombay*, xxiii, p. 23 (1914).

5 ♂, 5 ♀, 3 imm. Ban Kok Klap, Bandon, N.E. Malay Peninsula. June, July, 1913.

The first examples of this species which have been received from the Malay Peninsula, south of Tenasserim.

Mr. Oldfield Thomas has recently (*loc. cit. supra*) revised the races of this squirrel, has defined five sub-species of this animal, two of them from the neighbourhood of the Malay Peninsula—viz., *M. berdmorei berdmorei*, from Martaban to Mergui and the other *M. b. mouhoti*, Gray, from Southern Siam. These forms only differ in that the former is strongly washed with buffy below while the latter has the under surface white or whitish; they agree with each other in having the median dorsal and upper lateral blackish lines present but inconspicuous.

The series from Bandon, all collected at the same place and within a period of a few days, are very variable in this last respect, the variability not depending on age. In one or two the upper black markings are relatively inconspicuous but in the greater number are most clearly and strongly marked. Disregarding extremes the series closely resembles above the four specimens from Martaban and Mergui in the Indian Museum, Calcutta (Cat. Mam. Ind. Mus. 1891). As regards the lower parts, however, they are much less yellow but it is possible that the Indian Museum specimens, of which none are less than 40 years old, have undergone deterioration due to age and exposure.

The undersurface of some of the peninsular specimens is pale ivory white, in others it is suffused on the abdomen and thighs with ochraceous or orange buff. They thus appear to be intermediate between animals of the two adjacent races, but since the majority of the specimens possess the more richly coloured undersurface the series had for the present, better stand under the name of the parent race.

Strictly a ground species and only met with in the villages and in the scrub immediately surrounding the village rice-fields.

(For measurements see p. 124.)

27. DREMOMYS RUFIGENIS BELFIELDI.

Funambulus rufigenis belfieldi, *Bonhote, Journ. Fed. Malay States Mus.*, iii, p. 9, pl. I. (1908).

♀. Kao Nawng, Bandon, N.E. Malay Peninsula. 1,200-1,500 feet. June.

♀. Kao Nawng, Bandon, N.E. Malay Peninsula. 3,500 feet. June.

These specimens exactly agree with numerous skins from the Selangor mountains, the typical locality of the race, and differ from a co-type of *D. rufigenis*, Blanford, in being generally duller in colour, especially on the cheeks, and in having the hind-feet quite concolorous with the back. Bonhote in his description has reversed these facts and his letterpress applies to *D. rufigenis* and not * to *D. r. belfieldi* at all, though the plate correctly represents the latter form. The colour of the silky patch behind the ears appears to be a character of little importance.

The Bandon specimens appear very slightly smaller than those from the mountains of the Malay Peninsula further south, but the differences are insignificant and are quite possibly individual.

In Selangor this squirrel is confined to the ridges of the higher mountains where it lives a partially terrestrial existence amongst the giant *Pandanus* and the zephotic plants clothing the summits. In Bandon on the other hand it descends the hills and is found on the ground amongst the ordinary tropical vegetation of a submontane forest.

(For measurements *see* p. 124.)

28. RHINOSCIURUS TUPAIODES, BLAIR.

Rhinosciurus peracer, *Thos. and Wrought.*, *Journ. Fed. Malay States Mus.* iv, p. 120 (1909).

1. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400 feet. June, 1913.

2, 2. Ban Kok Klap, Bandon, N.E. Malay Peninsula. June, 1913.

Thomas and Wroughton (*loc. cit. supra*) separated a specimen from Perak from animals occurring in Selangor, which they identified as *R. tupaiodes*, under the above name, on the ground that while the tails of the latter were washed with whitish, the hairs of the former were tipped with buffy ochraceous.

Examination of the series of 26 long-snouted squirrels of the Peninsula in the Federated Malay States Museums (by far the largest in existence) shows that local races founded on these distinctions cannot at present maintained. Localities in the above series range from Bandon in the north to Negri Sembilan and Southern Pahang in the south, and individuals with yellowish and whitish washed tails occur both in the south and in the north. It is possible, however, that when larger collections have been made, it will be found that the majority of the animals living in the south will be seen to have tails with the paler colouration and if that is the case the name *peracer* can be revived.

(For measurements *see* p. 124.)

Measurements of squirrels from Bandon Province, N.E. Malay Peninsula :

Species.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind foot.	Greatest length of skull.	Candylo-basilar length.	Zygomantic breadth.	Inter-orbital breadth.	Breadth across post-orbital processes.
<i>Petaurista nitida</i> cicur	Ban Kok Klap	52/13	♀	422	523	77	71.5	63.4	48.6	15.3	37.8
"	"	53/13	♂	420	482	76	72.0	62.0	48.3	14.2	39.6
"	"	54/13	♂	416	512	78	74.4	66.0	47.3	15.0	39.0
"	"	55/13	♂	397	478	77	70.6	61.5	48.8	15.9	38.0
"	"	56/13	♂	422	518	78	73.8	64.0	49.8	14.9	36.3
"	"	57/13	♂	393	524	75	71.6	62.4	46.7	15.4	
"	"	58/13	♂	417	486	77	71.0	62.4	48.0	14.0	37.4
"	"	59/13	♂	391	522	81	73.0	63.2	47.8	15.3	37.2
"	"	60/13	♂	392	524	81	73.0	64.4	47.5	16.0	38.9
<i>Ratufa melano-pepla</i> peninsule	Kao Nawng.	250/13	♀	342	455	75	72.8	61.2	45.8	29.3	
<i>Sciurus erythræus</i> rube-culus	Ban Kok Klap	265/13	♀	363	462	79	71.6	58.2	45.5	27.5	
"	Kao Nawng, 3,500 ft.	66/13	♂	210	200	41	53.4	45.2	32.1	18.9	
"	"	67/13	♂	213	210	46	54.9	46.2	32.8	19.1	
"	"	68/13	♂	205	205	45	53.8	45.0	31.3	18.8	
"	"	69/13	♂	210	208	46	54.1	46.4	32.2	20.1	
"	"	70/13	♂	210	208	46	55.1	47.0	33.2	20.1	
"	"	71/13	♂	213	210	47	53.8	45.2	32.5	19.7	
"	"	72/13	♀	220	200	48	54.7	46.0	32.8	19.5	
"	"	73/13	♂	210	212	47	53.8	45.0	32.4	19.2	
<i>Sciurus hippurus</i>	Kao Nawng, 1,400 ft	132/13	♂	251	264	57	55.0	47.0	32.7	17.4	
"	"	133/13	♀	231	261	57	54.1	46.1	31.3	18.7	
<i>Sciurus concolor</i> milleri	Ban Kok Klap	178/13	♀	214	216	48	53.0	45	30.5	18.3	
"	"	179/13	♂	223	221	48	51.0	46.5		18.0	
"	"	180/13	♂	217	226	46.5	53.7	45.5	30.5	18.0	
"	"	181/13	♀	213	204	47.5	53.0	45	31.7	19.0	
"	"	182/13	♀	227	235	50	55.3	46.5		18.0	
"	"	183/13	♀	220	203	48		46.5	32.0	17.7	
"	"	184/13	♀	210	206	45	53.3	45	31.7	20.3	
"	"	321/13	♂	224	228	50	55.0	46.6	30.3	17.0	
<i>Sciurus vittatus</i> miniatus	Kao Nawng, 1,200-1,500 ft.	31/13	♀	190	171	42	48.3	40.6	28.9	17.2	
"	"	32/13	♀	191	182	43	49.1	43.0	29.7	18.2	
"	"	33/13	♀	192	182	43	49.3	41.4	29.8	17.3	
"	"	34/13	♂	167	174	46	45.2	39.0	26.7	16.4	
"	"	35/13	♂	194	179	46	49.1	42.0	30.0	18.4	
<i>Sciurus tennissurdus</i>	"	123/13	♀	136	109	30.5	35.2		21.7	12.9	
"	"	124/13	sub-ad.	131		32	36.7	30.0	21.3	12.3	
"	Kao Nawng, 3,500 ft.	128/13	♀	135	111	28	37.3	30.4		12.2	
"	"	131/13	♀	124	115	30	37.2	30.1	21.7	12.6	

Species.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind foot.	Greatest length of skull.	Condylar length.	Zygomatic breadth.	Inter orbital breadth.
<i>Sciurus tenuis gunong</i>	Kao Nawng, 3,500 ft.	125/13	♀	185	113	80	39.0	31.8	23.1	...
"	"	126/13	♀	182	117	32	39.2	31.9	...	...
"	"	127/13	♂	183	122	33	40.0	32.2	22.1	12.3
"	"	129/13	♂	140	122	33	40.0	33.0	23.0	12.7
"	"	130/13	♀	185	120	82	39.8	31.4	22.5	12.3
<i>Sciurus robinsoni</i>	Kao Nawng, 1,400 ft.	522/13	♀	122	103	31.5	34.5	28.8	20.8	11.0
<i>Tamias macclellandi novolineatus</i>	Ban Kok Klap	47/13	♀	99	101	23	30.2	24	28.0	11.1
"	"	48/13	♂	117		24.5	31.6	25.6	29.7	11.9
"	"	49/13	♂	107	108	24	31.4	25.7	29.1	11.9
"	"	50/13	♂	114	113	25	32.4	25.7	29.6	12.0
"	"	51/13	♀	102	108	25	31.2	23.8	28.0	11.7
<i>Larus insignis julorensis</i>	Kao Nawng, 3,500 ft.	27/13	♂	177	95	43	49.3	40.0	27.9	13.3
"	Kao Nawng, 1,200 - 1,500 ft.	28/13	♂	191	102	45	50.4	41.1	27.7	13.4
"	"	29/13	♂	182	103	43.5	49.1	40.3	27.7	13.5
"	"	30/13	♀	168	96	43	39.8	27.3	13.5	13.5
<i>Menetes berdmorei</i>	Ban Kok Klap	101/13	♂	195	142	41.5	47.7	40.4	26.0	13.5
"	"	102/13	♀	192	133	40.5	48.7	41.6	26.7	12.1
"	"	103/13	♂	194	128	43	50.8	43.5	27.0	13.0
"	"	104/13	♂	191	136	41	49.1	42.5	25.8	12.6
"	"	105/13	♀	193	148	41	49.0	41.6	25.3	12.7
"	"	106/13	♀	195	137	41	49.5	41.8	26.8	12.8
"	"	107/13	♀	192	145	41	48.6	41.6	25.8	12.1
"	"	108/13	♂	183	137	41	48.6	41.6	25.8	12.1
"	"	109/13	♂	196	149	42	50.0	42.8	26.0	12.5
"	"	113/13	♀	199	185	41	49.5	42.0	27.0	12.5
<i>Dremomys rufigenis belfieldi</i>	Kao Nawng, 1,200 - 1,500 ft.	120/13	sub-ad.	191	150	44	54.1	43.2	29.0	15.7
"	Kao Nawng, 3,500 ft.	121/13	♀	190	135	45	55.2	44.2	29.9	16.0
<i>Rhinosciurus tupaoides</i>	Kao Nawng, 1,400 ft.	322/13	♂	211	114	87	57.0	49.5	27.3	12.6
"	Ban Kok Klap	323/13	♂	196	116	40.5	54.2	47.5	26.0	13.2
"	"	324/13	♂	206	126	41.5	56.0	48.2	26.7	12.6
"	"	325/13	♀	202	107	41	55.4	48.5	26.9	13.3
"	"	326/13	imm.	199	184	41	...	44.8	...	12.7

29. *SPIMYS VOCIFERANS* (MILLER).

1 ♀. Ban Kok Klap, Bandon, N. E. Malay Peninsula. June, 1913.

2 ♂. Kao Nawng, Bandon, N. E. Malay Peninsula, 3,500 feet. June, 1913.

1 ♂, 2 ♀. Kao Nawng, Bandon, N. E. Malay Peninsula, 1,400 feet. June, 1913.

Agreeing well with topotypes from Trang.

(For measurements *see* p. 126.)

30. *EPIMYS SURIFER* (MILLER).

5 ♂, 7 ♀. Kao Nawng, Bandon, N.E. Malay Peninsula, 1,400-3,500, feet. June, 1913.

Common all over the mountain, the specimens from high levels not differing from those trapped at the foot of the hill.

(For measurements *see* p. 126.)

31. *EPIMYS ORBUS*, ROB. AND KLOSS.

Ann. Mag. Nat. Hist. (8) xiii, p. 228 (1914).

4 ♂, 1 ♀. Kao Nawng, Bandon, N.E. Malay Peninsula. 3,500 feet. June, 1913.

There is little to add to our original description of this rat which is very distinct from any Malayan species hitherto described, though a closely allied form is met with in the mountains of West Sumatra. As far as can be ascertained from the single female skin available the mammary formula seems to be one pectoral and two inguinal pairs, therein differing from that given for *Epimys fulvescens* (Gray) by Blanford.

Though we have named the present form binomially there is not the least doubt that it is closely allied to the Indian form *E. fulvescens* from the Himalayas and *E. cinnamomeus*, Blyth from Northern Tenasserim. Of the latter there is a typical specimen in spirit in the Indian Museum, which differs in its less spiny pelage and apparently richer colouration. No reliable conclusions can however be drawn from specimens over 50 years old and until adequate modern material is available it appears safer to regard the present form as a distinct species.

The characters of the infra-orbital plate given by Blanford are of course merely those separating species of the "rattus" section from the bicolor rats with small bullæ, typified in the Malayan region by *E. surifer* and its allies.

(For measurements *see* p. 126.)

32. *EPIMYS RATTUS JALORENSIS* (BONH.).

2 ♂, imm. Bau Kok Klap, Bandon, N. E. Malay Peninsula. June, 1913.

33. *EPIMYS VALIDUS* (MILLER).

1 ♂. Kao Nawng, Bandon, N. E. Malay Peninsula, 1,400 feet. June, 1913.

Miller (*Smithsonian Misc. Coll.* vol. 61, no. 21, p. 19 (1913) has, under the name, *Epimys victor*, recently separated southern peninsular representatives of this species from the typical *E. validus* of Trang on the grounds that the teeth are smaller, the outer anterior tubercle in m^2 and m^3 less developed and the greatest skull length about 60 mm. as compared with 55 mm. in northern animals.

But the type series of *Mus validus* consisted of two individuals only, and as is now shown animals from the Siamese States are as large, if not larger, than the southern forms, while examination of a series of some 30 individuals ranging throughout the Peninsula shows that no reliance can be placed on the absence or otherwise of an anterior outer tubercle as a distinguishing character. *Epimys firmus* of the Rhio Archipelago is also stated to have the molar tubercle lacking but we find it present in four or five individuals out of a series of 15 from the Karimon Islands and Pulau Kundur.

In October, 1911, we described a peninsular rat under the name of *Mus muelleri fæderis* (Journ. Fed. Malay States Mus. iv, p. 245, 1911) but a comparison of the type with the much larger series of *Epimys validus* now in our possession shows that this name must also be regarded as a synonym of that species.

(For measurements see below.)

Measurements of rats from Bandon Province, N.E. Malay Peninsula :

Species.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind foot.	Greatest length of skull.	Condylar length.	Zygomatic breadth.	Maxillary tooth row.
<i>Epimys vociferans</i>	Ban Kok Klap	114/13	♀	238	361	44.5	55.0	46.5	24.8	10.0
"	Kao Nawng	115/13	♀	236	354	44.0	56.2	48.0	26.0	10.3
"	"	116/13	♀	234	353	43.5	55.7	47.3	25.8	10.3
"	"	118/13	♂	229	367	44.0	55.9	47.0	25.0	10.0
"	Kao Nawng	117/13	♂	230	345	43	55.3	47.0	24.4	9.8
"	3,500 ft.									
<i>Epimys surifer</i>	Kao Nawng	36/13	♀	164	180	35	42.2	35.5	18.2	6.8
"	"	37/13	♂	177	195	37	44.0	37.0	19.4	6.8
"	"	38/13	♂	177	184	40	42.2	35.0	18.9	6.2
"	"	40/13	♀	175	188	35	44.6	37.8	19.8	6.7
"	"	41/13	♂	200	195	41	47.0	39.1	20.0	6.9
"	"	42/13	♀	178	190	38	40.0	34.0	17.7	6.8
"	"	43/13	♂	197	213	42	46.8	38.7	19.0	6.2
"	"	45/13	♀	184	204	37	44.4	37.2	18.7	6.8
"	"	46/13	♀	170	190	38	42.8	36.0	19.0	6.4
"	"	119/13	♂	191	208	39	44.7	36.9	18.6	6.4
"	"	285/13	♀	183	147	37.5	44.1	36.8	19.1	6.9
"	"	428/13	♀	188	204	38.5	43.8	36.8	19.0	7.2
<i>Epimys orbus</i>	Kao Nawng	61/13	♂	153	235	32	37.9	31.0	17.0	6.8
"	3,500 ft.									
"	"	62/13	♂	157	238	33	39.0	32.7	17.5	6.8
"	"	63/13	♂	150	220	30	39.0	32.0	..	6.8
"	"	64/13	♂	158	229	30.5	37.7	30.6	16.8	6.2
"	"	65/13	♀	145	230	31	38.1	32.0	17.1	6.8
<i>Epimys validus</i>	Kao Nawng	122/13	♂	257	323	52	61.0	53.0	30.3	11.1

34. RHIZOMYS SUMATRENSIS (RAFFLES).

Rhizomys erythrogenys, *Anderson, Proc. Asiat. Soc. Bengal*, p. 150 (1877).

2 ♂ imm. Ban Kok Klap, Bandon, N. E. Malay Peninsula. June, 1913.

Two immature specimens with the permanent molars just coming into place agree sufficiently well with the description of *R. erythrogenys*, Anderson, which is obviously founded on immature specimens of *R. sumatrensis* as stated by Blanford. The figure given by Anderson. (*Zool. Res. Yunnan*, pl. XIII) is much too bright with the upper surface bluish steel grey not iron grey as is actually the case.

35. TRAGULUS RAVUS, MILLER.

Miller, Proc. Biol. Soc. Washington, xv, p. 173 (1902).

1 ♀. Ban Kok Klap, Bandon, N. E. Malay Peninsula. June, 1913.

Head and body, 435; tail, 78; hind foot, 119; ear, 36.

Skull.—Greatest length, 92.5; greatest breadth, 41.6 mm.

THE ZOOLOGY OF KOH SAMUI AND KOH PENNAN.

I. INTRODUCTION.

By H. C. ROBINSON, C.M.Z.S., M.B.O.U., DIRECTOR OF MUSEUMS, F.M.S.

IN view of the interesting results yielded by the zoological exploration of the Tioman group of islands off the coast of Johore and Pahang on the eastern side of the Malay Peninsula, it was thought that a similar investigation of the islands lying off the Bight of Bandan in the north-east of the Malay Peninsula might prove equally profitable. With the permission of His Excellency the High Commissioner, Malay States, and the Chief Secretary, Federated Malay States, and provided with introductions from the Siamese authorities, an expedition was arranged by the Federated Malay States Museums in the early part of 1913 and large collections of mammals and birds and smaller ones of plants and reptiles were made on the islands.

The collections, though in some ways disappointing, are sufficiently interesting to merit description in detail, and full lists are given in the succeeding pages, which are prefaced by the following short account of the general character of the islands, which have been little visited by Europeans and are hardly, if at all, represented in the local literature.

Koh¹ Samui situated between the parallels of 9° 22' and 9° 34' N. and between longitude 99° 56' and 100° 07' E. is considerably the largest island on the east coast of the Malay Peninsula, being only approached in size by Pulau Tioman. It is situated well within the ten-fathom line and at its nearest, is distant from the mainland about nine miles, this distance being bridged over by a chain of several small islets.

The surface is very irregular, rising to a maximum elevation in the centre of the island of 2,200 feet, several other ranges exceeding 1,500 feet in height. These elevations are mainly disposed in long ridges, running roughly from S.E. to N.W., having large areas of flat or gently undulating land, between the hills, which are very steep.

On the east large areas are quite flat, having the appearance of recent elevation; near the coast they are sandy and devoted to the cultivation of coconuts, but further inland the soil is better and a considerable amount of swamp rice is grown. On the north, west and south, the ground is more broken and the hilly ground comes quite down to the coast. There are several streams of permanent water, some of considerable size, but, in the dry season, which was the time of our visit, those on the eastern side were much diminished in crossing the sandy coastal plain, and potable water was scarce and poor in quality.

¹ Koh or Kaw (Siamese) = Island.

The hill sides, to a very considerable height, have been much denuded of their original timber, little control being exercised over the local population, which annually destroys much jungle for the plantations of hill rice, which, when abandoned, are overgrown with a worthless secondary growth of bamboo and thorny shrubs.

The population is large, and was said by the local magistrate to exceed 8,000 people, who subsist by the growth of rice and fruit, large quantities of coconuts being exported to Bangkok, and fruit, principally arecanuts and mangoes, to Bandon. Many pigs are reared by the local population but little fishing is done and the island afford but few supplies to the European visitor, even bananas and fowls being scarce and hard to obtain. On the north coast a small lode of wolfram ore has of late years been worked but has not proved commercially successful. The coasts of the island seems to be formed of schists, gneisses and other metamorphic rocks, but the central core and the taller hills are granite.

Koh Pennan,¹ situated to the north of Koh Samui, separated from it by a channel about eight miles wide carrying a maximum depth of nine fathoms, is considerably smaller than the latter island, being roughly elliptical in shape with a long diameter of about ten miles and a short one of about six. It rises to about the same height, but the surface, generally speaking, is more rugged and there is not nearly the same proportion of flat land, except on the south coast. The population is considerably smaller but a large amount of copra and coconuts are produced, which are shipped to Bangkok. As in Koh Samui, the population is almost exclusively Siamese, though there are a certain number of trading Chinamen from Bangkok and the adjacent mainland. Malay is not spoken or understood on either island and we had great difficulty in obtaining an interpreter who knew even a few words of the language.

We collected at three localities on Koh Samui, at :

- (1). Klong Pah Yie towards the northern end of the west coast where we stayed from May 6th to May 13th, the surrounding country being mainly coconuts, rice fields, grazing ground or secondary jungle :
- (2) On the headwaters of a stream rising in the centre of the island, in the middle of the only considerable area of virgin jungle, on the island, where we built a camp and collected from May 15th to May 17th ; and
- (3) On a bay near the N.E. coast which proved singularly uninteresting and unhealthy and at which we only stopped from May 18th to May 23rd.

On Koh Pennan we had one station only, near the S.W. corner of the island, where we established ourselves in a comfortable tin-roofed "sala" built by a pious Siamese, staying from May 24th to June 1st when we set sail for the mainland of Bandon which we reached after a rather irksome journey of three days.

¹ Known also as Pungun and Pungunn.

II. MAMMALS.

By H. C. ROBINSON, C.M.Z.S., AND C. BODEN KLOSS, F.Z.S.

The mammalian fauna of Koh Samui and Koh Pennan proved disappointing and the islands are noteworthy rather for the species that are not represented than for those that do actually occur.

It may safely be asserted that they have derived their fauna from those districts of the Peninsula immediately adjacent: for instance the only squirrels present are forms of the continental *Sc. concolor* and a species of Giant squirrel closely related to the mainland form, *R.m. peninsulae*. No *Rhinosciurus* is known nor are races of *Sciurus tenuis*, *Sciurus vittatus* or *Sc. nigrovittatus*. Flying squirrels, a characteristic feature of the fauna of many of the local islands, may definitely be stated to be absent, and the same is the case with two other characteristic flying mammals—viz., *Galeopterus* and bats of the *spectrum* section of *Pteropus*, which are known from almost every other island of the China Sea. Indeed for some obscure reason bats of all species were practically absent and, with the exception of the universally distributed *Cynopterus*, only one other individual, probably an Emballonure, was even seen. Wild pigs were reported on both islands but they were almost certainly only feral specimens of the local Siamo-Chinese breed.

Leaf-monkeys occurred on Koh Samui but have now been eaten out. The Kra (*Macacus irus*) was found on both islands but was rare and shy, while *M. nemestrina* is stated on native authority to be found on Koh Pennan. Captive specimens were seen but their provenance was uncertain and they had not improbably been brought from the adjacent mainland.

Moose-deer were absent from both islands; barking-deer occur on Koh Samui (not on Koh Pennan) but are assiduously shot by the native population; an immature specimen was obtained by us, but affording no differential characters, was not preserved.

Otters were common and the duyong is occasionally found in shallow bays on the western side of Koh Samui.

1. PRESBYTIS OBSCURA HALONIFER, CANTOR.

3 ♂, 2 ♀, 3 ♂ immature.

No monkeys of this genus occur on Koh Samui, though they were comparatively common but very wild on Koh Pennan.

The series of five adults differ considerably *inter se*. Two old females in somewhat worn pelage have the pileum strongly tinged with yellowish, a marked median bronzy line on the back, and a pale yellowish-white area at the base of the thighs. The males are darker and greyer, the yellowish tinge is absent from the cap and the bronzy median line is practically absent in two specimens though just visible in the third.

Like the other island races from the islands of the Malay Peninsula, they are darker than the northern mainland form *P. obscura halonifer*, with which for the present we unite them.

A young male in the golden stage of pelage has the fur between the shoulders distinctly curly.

(For measurements *see below*.)

2. *MACACA IRUS* CUVIER.

2 ♂. Koh Samui.

2 ♀. Koh Pennan.

The two males from Koh Samui are practically indistinguishable from examples obtained in the Federated Malay States, the annulations of the hairs are well marked over body and limbs.

The females from Koh Pennan are in worn pelage and most closely resemble animals in similar condition from Penang Island: the annulations have almost disappeared.

The Koh Samui animals and those from the Federated Malay States, with which they are compared, were shot inland in high jungle: the examples from Penang and Koh Pennan are sea-shore dwelling individuals and as they present the same appearance and differ from others it is probable that this may be traced to the effect of salt air and greater exposure to light.

(For measurements *see below*.)

Measurements of monkeys from Koh Samui and Koh Pennan:

Species.	Locality.	N. M. No.	Sex.	Head and body.	Tail.	Hind feet.	Greatest length of skull.	Basal length.	Zygomatic breadth.	Maxillary tooth row.
<i>Presbytis obscura halonifer</i>	Koh Pennan	536 13	♂	536	700	153	101.5	73.6	76.0	81.0
"	"	539 13	♂	530	750	163	—	—	—	—
"	"	541 13	♂	541	722	152	99.0	72.0	78.5	83.0
"	"	535 13	♀	491	695	145	—	—	—	80.0
"	"	537 13	♀	505	693	140	90.6	65.6	69.0	74.0
<i>Macaca irus</i>	Koh Samui	544 13	♂	437	502	119	115.7	83.0	87.2	90.0
"	"	545 13	♂	423	457	125	114.0	82.0	79.5	86.0
"	Koh Pennan	542 13	♀	391	442	114	102.0	70.7	71.0	75.3
"	"	543 13	♀	400	411	109	97.5	66.0	66.0	73.0

3. *PARADOXURUS MINOR*, BONHOTE.

Fascic Malay., Zool. I, p. 9 (1903).

1 ♀, 1 ♀ imm

* These specimens appear to be members of the species known as *P. minor* with which we are familiar (though at present we have no

topotypes for purposes of comparison). Though the body dimensions appear to be a little larger the cranial measurements and external appearance of the adult female are practically those of the type. The convergence on the neck and crown of the black dorsal stripes is particularly notable in both examples.

Measurements: head and body, 580; tail, 443; hind foot, 73; ear, 45. Skull: greatest length, 96.2; condylobasal length, 95.3; basal length, 95.3; palatal length, 41.7; extension of palate beyond m^3 , 2.2; breadth of palate between canines, 10.1; between carnassials, 14.8; rostral breadth, 17.6; inter-orbital breadth, 16.4; post-orbital breadth, 12.2; zygomatic breadth, 54; greatest cranial breadth, 34.5; maxillary tooth row (c-m'), 34; mandibular tooth row, 40; length of mandible, 71.

4. TUPAIA FERRUGINEA OPEROSA.

Robinson and Kloss, Ann and Mag. Nat. Hist. (8), vol. xiii, p. 233 (Feb. 1914).

Koh Pennan, 33 examples.

This form exhibits close relationship with *T. belangeri* of Tenasserim and more northern areas, while such examples of the Bandon animal as have been collected show, as we have pointed out elsewhere, less differentiation from *T. ferruginea* of the southern portion of the Peninsula, as far as colour is concerned, than does *F. f. wilkinsoni* which occurs on the west coast between the latitudes of the above-mentioned places.

(For measurements, see below.)

5. TUPAIA FERRUGINEA ULTIMA.

Robinson and Kloss, tom. cit., p. 234.

Koh Pennan 14 examples.

Differ from *T. f. operosa* in the possession of duller pelage and shorter rostrum and thus, still more than that race, approaches the continental species *T. belangeri*.

(For measurements see p. 133.)

Measurements of *Tupaia* from Koh Samui and Koh Pennan:

Species.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind foot.	Greatest length of skull.	Greatest cranial breadth.	Pip of premaxillaries to lacrymal notch.
<i>Tupaia ferruginea operosa</i>	Koh Samui	83/13	♂	179	165	43	50.5	19.8	20.8
"	"	88/13	♀	181	144	39.5	48.0	19.0	18.8
"	"	89/13	♂	170	169	38	48.1	18.6	18.9
"	"	91/13	♂	178	174	40.5	48.5	19.0	19.8

Species.	Locality	S. N. No.	Sex.	Head and body.	Tail.	Hind foot.	Greatest length of skull.	Greatest cranial breadth	Pip of premaxillaries lachrymal notch.
<i>Tupaia ferruginea operosa</i>	Koh Samui Type	93 13	♀	163 155	40		47.2	18.9	18.8
"	"	428 13	♂	168 166	40		48.4	19.1	19.1
"	"	432 13	♂	156 -	40		49	18.9	18.8
"	"	435 13	♂	166 166	40		48.4	19.1	19.2
"	"	437 13	♀	170 165	40		47	18.5	18.5
"	"	138/13	♀	160 154	40		46.2	18.0	17.8
"	"	439 13	♀	162 160	40.5		46.8	18.8	18.2
"	"	440 13	♂	173 -	40		50.0	19.0	20.0
<i>Tupaia ferruginea ultima</i>	Koh Pennan	90 14	♀	162 161	37.5		46.0	19.3	18.0
"	Type	95 13	♀	166 162	38.5		45.8	19.0	17.6
"	"	96 13	♀	165 163	37.5		45.8	18.9	17.8
"	"	97 13	♀	172 175	39.5		47.2	19.2	18.6
"	"	98 13	♂	174 170	38.5		47.3	19.0	18.7
"	"	99 13	♀	161 164	40		47.2	18.7	19.0
"	"	100 13	♂	168 166	39		48.2	19.0	19.0
"	"	267 13	♀	165 166	38		45.0	18.4	17.4
"	"	268 13	♀	163 162	37		46.0	18.6	17.0
"	"	269 13	♀	163 157	36		45.3	18.6	17.5
"	"	270 13	♂	168 165	39		47.3	18.3	18.7
"	"	444 13	♂	168 168	39		46.4	18.8	18.5

6. *CROCIDI RA NEGLIGENS*

Robinson and Kloss, loc. cit., p. 232

1 ♂. Koh Samui

The single specimen obtained, while about the same size as *C. malayana* of the Malay Peninsula, differs in being of a much paler tint, the pelage being of a neutral grey, slightly washed above with brownish so that at a distance it closely resembles in general tone the "Mouse grey" of Ridgway.

Measurements: head and body, 92; tail, 62; hind foot, 14.7; lar, 10. Skull: palatal length, 9.4; lachrymal breadth of rostrum, 4.2; greatest breadth above molars, 7.0; maxillary tooth row, including incisors, 10.1; mandibular tooth including incisors, 9.0.

7. *CYNOPTERUS BRACHYOTIS ANGULATUS*, MILLER

Koh Samui, 8 examples.

Koh Pennan, 11 examples.

Our remarks on *C. b. angulatus* of the mainland (antena) apply even more strongly to these island animals.

(For measurements see p. 134.)

Measurements of *Cynopterus b. angulatus* from Koh Samui :

S M No.	357/13	358/13	359/13	360/13	377/13	370/13	376/13
Sex ..	♀	♀	♀	♀	♀	♂	♂
						imm	imm
Head and body	97	94	98	98	96	97	90
Tail	18	11	12	14	9	13	10
Hind foot	14.5	14	14	14	13.5	14	13
Ear	21	21	20	20.5	21	20.5	20
Fore-arm	71	68	68	70	69	71	72
3rd Metacarpal	17	15.2	13.6	13.4	14.0	13.4	13.6
III'	30.8	28.7	28.4	27.8	28.3	28.0	27.0
Tibia (approximate)	25.5	25.5	24.8	23.8	24.0	24.0	23.3
Greatest length of skull	32.0	30.7	30.9	32.0	31.3	30.8	30.9
Condyllo-basal length	30.3	29.1	29.5	30.1	29.9	29.5	29.4
Zygomatic breadth	19.7	20.0	20.4	21.0	20.0	20.0	19.3
Rostrum	8.0	8.0	7.9	8.0	8.4	8.1	8.5
Mandible	24.6	23.6	23.5	21.0	23.3	23.3	23.8
C-m' crowns	10.8	10.3	10.2	10.0	10.3	10.2	10.1

Measurements of *Cynopterus b. angulatus* from Koh Pennan.

S M No.	355/13	356/13	361/13	362/13	371/13	353/13	372/13
Sex	♂	♂	♂	♂	♂	♀	♀
					imm		
Head and body	99	93	97	98	92	98	99
Tail	13	12	13	15	12	14	12
Hind foot	14	15	13.5	15.5	14	14	14
Ear	20	18.5	20	19	19.5	20	19.5
Fore-arm	73	68	71	73	68.5	71	69.5
3rd Metacarpal	—	14	14.3	15.7	12.6	14	14
III'	28.5	28.5	28.1	29.5	26.6	28.2	28.1
Tibia (approximate)	25.0	24.0	24.3	26.0	22.5	26.8	23.2
Greatest length of skull	31.3	30.4	32.3	32.1	30.4	30.4	32.0
Condyllo basal length	30.0	28.9	30.9	30.7	—	28.5	30.3
Zygomatic breadth	21.5	20.1	20.8	20.9	19.8	19.9	20.3
Rostrum	8.1	7.7	8.0	8.8	8.0	8.6	8.1
Mandible	23.9	23.0	23.2	25.0	23.0	23.7	24.3
C-m' crowns	10.2	10.0	10.3	10.8	10.1	10.0	10.5

s. *RATUFA MELANOPEPLA DECOLORATA*

Robinson and Kloss, tom cat, p 227.

Koh Samui, 13 examples

Koh Penan, 1 example

When we described this race of Giant-squirrel we were unaware that the type locality of *Ratufa melanopepla* was (as Mr G. S. Miller has recently pointed out¹) the island of Telibon off the west coast of the Peninsula, and not Trang on the mainland as was originally stated by him.

No distinction has been drawn between the colour of the Telibon Island form and that from the mainland with which the present race closely agrees, but in size the animal inhabiting the Bandon Islands appears to be a little smaller than the western insular race and thus considerably smaller than the peninsular animal.

(For measurements see p. 135.)

¹ *Smithsonian Miscellaneous Publications*, Vol. 61, No. 21., p. 25 (Dec. 29, 1913).

Measurements of *Ratufa* from Koh Samui and Koh Pennan :

Name.	Locality.	Number.	Sex.	Head and body.	Tail.	Hind feet without claws.	Greatest length of skull.	Condylar-basilar length.	Zygomatic breadth.	Inter-orbital breadth.
<i>Ratufa melano-pepla decolorata</i>	Koh Samui, W. Side <i>Type</i>	251/13	♀	328	417	68	68.7	57.1	42.6	26.2
"	"	252/13	♀	319	424	67	70.8	57.8	43.2	24.6
"	" Hills	254/13	♀	319	395	69	66.9	56.9	41.8	27.0
"	" W. Side	255/13	♀	307	420	73	67.6	57.1	41.0	24.1
"	" Hills	256/13	♀	311	394	69	67.8	57.2	41.4	23.9
"	" W. Side	257/13	♀	326	411	72	70.3	58.8	43.0	—
"	"	258/13	♀	315	387	66	67.2	55.2	41.9	25.8
"	"	259/13	♀	318	404	71	69.4	57.7	43.1	26.8
"	"	260/13	♀	293	404	70.5	61.3	53.9	38.2	24.4
"	"	261/13	imm.	323	382	70	67.4	56.4	40.4	24.0
"	" Hills	263/13	♂	315	388	69.5	65.8	51.9	42.1	24.5
"	" W. Side	264/13	♂	312	361	66	64.0	53.4	41.1	26.0
"	S. W. Koh Pennan	266/13	♀	323	412	69	70.2	57.1	42.3	26.1

9. *SCIURI'S CONCOLOR SAMUIENSIS*.

Robinson and Kloss, tom. cit., p. 226.

Koh Samui, 40 examples.

Occurring in enormous numbers in the coconut groves of the island and causing very serious damage to the crops. Also met with, though much less numerously, in the primæval jungle in the centre of the island.

There is little doubt that this race is very markedly distinct from all the mainland races of *Sc. concolor*, occurring on the Peninsula itself and also from all the island races adjacent to our area, with the possible exception of *Sc. c. epomophorus* from Salanga (Junk Ceylon), from which race it is apparently distinguished by the more ochreous colour of the shoulder and thigh patches, which are "hazel" in the Salanga form. The degree of brilliance of the very large series before us, all collected within a period of three weeks, varies very greatly and the most ornate approach that form of the Tenasserim *Sc. concolor caniceps* known as *Sc. concolor chrysonotus*, from which they may be differentiated by slightly smaller size and darker colour beneath.

It is possible that the whole series has been collected during a period of transition between a normal breeding pelage and one of "eclipse" though there is no direct evidence that such occurs in any member of the *Sciuridae*, found south of the Isthmus of Kra.

(For measurements see p. 136.)

10. SCIURUS CONCOLOR FALLAX.

Robinson and Kloss, tom. cit., p. 225.

Koh Pennan, 35 examples.

Met with under similar conditions to the preceding race.

These two forms are of course very closely related and present only average differences, which are however, quite well marked when the two series are compared as a whole.

The brightest specimen of *Sc. c. fallax* is not more brilliant than the dullest of *Sc. c. samuiensis* though the two series were collected at practically the same time of year.

The differences in colour may be correlated with a real difference between the climates of the two islands, Koh Pennan, the seaward one, being stated to have a much greater and more uniformly distributed rainfall than the landward one, Koh Samui.

(For measurements see below.)

Measurements of *Sciurus* from Koh Samui and Koh Pennan:

Species.	Locality.	S. M. No.	Sex.	Head and body.			Greatest length of skull.	Condyle-basilar length.	Zygomatic breadth.	Inter-orbital breadth.
					Tail.	Hind foot.				
<i>Sciurus concolor samuiensis</i>	Koh Samui Type	201/13	♂	234	242	49	56.1	48.2	32.8	19.9
		202/13	♂	229	223	49.5	54.2	46.0	30.5	18.5
		206/13	♂	225	214	50	55.5	47.1	32.4	19.0
		208/13	♀	222	232	49	56.0	47.5	31.5	20.0
		211/13	♂	222	238	51	55.0	47.5	31.7	19.9
		229/13	♀	239	238	49	55.0	47.3	31.9	20.3
		230/13	♂	221	223	49	54.0	46.5	32.0	18.2
		241/13	♀	237	218	48.5	56.0	47.7	32.0	19.6
		246/13	♂	255	197	49.5	54.4	46.4	33.4	19.7
		249/13	♀	223	230	49	55.3	47.0	31.2	19.5
<i>Sciurus concolor fallax</i>	S.W. Koh Pennan Type	134/13	♂	226	237	49.5	55.5	47.9	33.2	21.2
"	S. "	136/13	♂	221	230	48	55.3	47.9	32.2	19.6
"	"	139/13	♂	225	245	49	56.8	47.4	32.9	21.3
"	"	141/13	♀	225	217	48	56.3	48.9	33.2	20.3
"	"	146/13	♂	234	248	50	56.8	48.8	33.2	20.8
"	"	147/13	♀	241	227	51.5	57.1	49.0	32.5	20.2
"	"	152/13	♂	228	236	48	56.4	49.5	33.1	20.2
"	"	154/13	♀	233	—	51.5	57.6	49.2	33.3	20.4
"	"	157/13	♀	225	234	50	57.1	49.6	31.8	19.2
"	"	162/13	♀	222	225	50	56.3	47.8	33.7	20.1
"	"	166/13	♀	204	228	50	57.0	48.2	32.1	20.0

11. EPIMYS SURIFER MANICALIS.

Robinson and Kloss, tom. cit., p. 230.

Koh Pennan, 21 examples.

On account of the broad white band or cuff which in extreme examples extends over the whole of the forearm this is externally one of the most differentiated island races of *E. surifer* in the peninsular area.

(For measurements *see* p. 138.)

12. EPIMYS SURIFER SPURCUS.

Robinson and Kloss, tom. cit., p. 230.

Koh Samui, 23 examples.

Koh Samui being nearer to the mainland than is Koh Pennan this race has had a shorter time to evolve peculiar characters than has had *E. s. manicalis*, but it has made sufficient progress in the same direction to differentiate it from the mainland animal. It is curious to find that *E. s. spurcus* bears in other respects a close resemblance *E. S. flavidulus*, a form occurring in Pulau Langkawi, an island on the other side of the Peninsula, and from this it is mainly distinguished by the different proportion of length of body and tail.

(For measurements *see* p. 138.)

13. EPIMYS JERDONI PAN.

Robinson and Kloss, tom. cit., p. 229.

Koh Samui, 5 examples.

This is a slightly differentiated form of the mainland *E. j. bukit*, and is the first representative of that animal that has been found on any of the islands in the neighbourhood of the Malay Peninsula.

(For measurements *see* p. 138.)

14. EPIMYS REMOTUS.

Robinson and Kloss, tom. cit., p. 231.

Koh Samui, 6 examples.

Koh Penman, 3 examples.

This species was originally described from a series of six examples taken on Koh Samui but on further examination of material from the islands it appears that three individuals from Koh Penman must be allocated to it also.

In addition to the differences already pointed out they may be distinguished from *E. rattus*, which smaller animals superficially resemble, by the much greater length of tail which broadly exceeds in every case that of head and body by 50 mm. as against about half that amount in the other, and also by difference of habit in that they are forest dwellers while *E. rattus* congregates only in the neighbourhood of houses or villages.

(For measurements *see* p. 138.)

Species.	Locality.	S. M. No.	Sex.	Head and body.	Tail.	Hind foot.	Greatest length of skull.	Condylar-basilar length.	Zygomatic breadth.	Maxillary toothrow.
<i>Epimys rattus jalorensis</i>	Koh Samui	381 13	♀	174	195	34	43.9	37.6	20.4	7.6
"	"	383 13	♂	170	200	34	43.0	37.0	19.5	7.5
"	"	446 13	♀	161	178	32	41.9	35.8	20.5	7.5
"	"	456 13	♂	174	201	35	43.4	38.0	21.5	7.6
"	"	458 13	♂	189	190	33.5	44.0	37.6	21.0	7.1
"	"	465 13	♀	169	191	31.5	40.8	36.0	20.6	7.5
"	"	467 13	♂	163	176	32	42.0	36.2	20.0	7.5
"	"	502 13	♀	157	182	33	41.0	35.2	19.4	7.2
"	"	506 13	♀	172	195	32	42.5	37.0	20.0	7.3
"	"	97 14	♂	177	186	34	43.2	36.6	19.1	7.1
"	Koh Penuan	188 13	♂	180	196	35	42.0	36.8	20.0	7.3
"	"	189 13	♂	182	184	34	43.0	36.8	20.3	7.1
"	"	194 13	♂	172	180	35	40.1	35.4	18.4	7.0
"	"	196 13	♀	168	194	33	40.8	35.7	19.0	7.0
"	"	302 13	♂	169	174	33	40.5	35.4	19.2	6.9
"	"	305 13	♂	171	171	32.5	40.0	35.5	20.0	7.4
"	"	306 13	♂	171	186	32	42.0	36.3	20.1	6.9
"	"	307 13	♀	169	189	33	42.6	36.0	20.5	7.8
"	"	314 13	♂	170	182	32.5	—	38.2	20.8	7.7
"	"	318 13	♂	192	190	34	41.8	—	20.8	7.7
"	"	319 13	♂	166	176	33.5	40.6	35.8	20.4	7.2
"	"	93 14	♂	193	209	35	44.8	38.0	21.0	7.0

III. BIRDS.

By H. C. ROBINSON, C.M.Z.S., M.B.O.P.

The main object of our visit to the group was the acquisition of large series of the local mammals and we did not therefore attempt to collect many individual specimens of birds, though an example of every species seen was, if possible, obtained.

As is the case with all the islands off the east coast of the Malay Peninsula the ornithology presents few features of interest and after allowing for varying circumstances, such as the degree of deforestation, and the existence or otherwise of paddy land, is identical in all the islands. In all, certain birds such as *Cittocinclera macrura*, *Eulabes* sp. and *Calornis chalybea* are very common while certain groups such as the Woodpeckers, Barbets, Trogons and Timeliids are either rare or entirely absent. The present islands differ from Pulau Tioman and Tinggi further south in possessing two species of game bird, *Turnix taigoo* and *Gallus gallus*; but the latter, of which we did not obtain specimens, has possibly merely been introduced by the Siamese population the local domestic breed being extraordinarily close to the wild bird. Hornbills, *Dichoceros bicornis*, also were common on the hills, but these as well as *Alcedo meninting* and *Accipiter gularis* were only noted though they were seen more than once. The

common fishing owl *Ketupa javanensis* was seen on the rice-fields and the note of a *Scops*, probably *Sc. lempiji*, heard in the jungle on the hills. As on every other island on these coasts, birds, in the old jungle, were extraordinarily scarce both in species and in individuals, the only ones at all common being, *Cittocincla macrura*, *Eudynamis honorata*, *Micropus melanocephalus* and *Cyornis sumatrensis*. In the secondary jungle *Pellorneum subochraceum* and *Turdinus olivaceus* were not infrequent, while, in the open country and among the coconut groves, *Pycnonotus finlaysoni*, *Calornis chalybea*, *Eulabes intermedia* and the two bee-eaters were the dominant forms. All the sunbirds (with the exception of *N. malaccensis*) the flower pecker, *Dicaeum cruentatum* and *Mixornis gularis* were confined to a narrow littoral belt. The rice-field birds were those common in similar situations all over the Malay Peninsula.

The Black and White Imperial Pigeon (*Myristicivora bicolor*) which swarms on the southern islands at about the same time of year was not met with, though it possibly occurs, while the existence of the Finfoot *Heliornis personata* on Koh Pennan is a very surprising fact. The cormorant, which was common, is hardly known further south.

Two species not hitherto met with within the limits of the Malay Peninsula—viz., *Collocalia merguensis* and *Acrocephalus bistrigiceps* were secured, the former being extraordinarily abundant, breeding in great numbers on caves and hollows in the chain of small rocky islands between the larger islands and the mainland.

. TURNICIDÆ.

1. TURNIX TAIGOOR.

Turnix taigoor (Sykes); Ogilvie Grant, Cat. Birds Brit. Mus., xxii, p. 530 (1894).

Fairly common on both islands among the *lalang*.

PHASANIDÆ.

GALLUS GALLUS.

antea, p. 87.

Jungle cock were heard on the west side of Koh Samui but none were obtained.

TRERONIDÆ.

2. TRERON NIPALENSIS.

Treron nipalensis (Hodgs.); Salvadori, Cat. Birds Brit. Mus., xxi, p. 34; Robinson and Kloss, Ibis., 1910, p. 674.

The Thick-billed Pigeon was very common on Koh Samui.

3. OSMOTRERON VEENANE.

antea, p. 88.

Fairly common on both islands but not nearly so numerous as on the Tioman group, further south.

A hard set egg was secured on Koh Pennan on May 27th. The nest consisted of a few loosely woven twigs placed in a small bush about five feet off the ground.

CARPOPHAGA AENEÆ.

Carpophaga aenea (Linn.); Salvad., tom. cit., p. 190.

The Bronze Imperial Pigeon was numerous on both islands; specimens were shot but not preserved.

COLUMBIDÆ.

4. TURTUR TIGRINUS.

antea, p. 88.

Exceedingly abundant on both islands. We preserved a male from Koh Pennan.

5. CHALCOPHAPS INDICA.

antea, p. 88.

Fairly common in the jungle on both islands. We obtained two males on Koh Samui.

RALLIDÆ.

6. LIMNOBENUS FUSCUS.

Limnobenus fuscus (Linn.); Sharpe, Cat. Birds Brit. Mus., xxiii. p. 146 (1894).

One male from Koh Samui.

"Iris and orbits red, bill bluish green, legs pale coral, claws black."

7. AMAURORNIS PHŒNICURA CHINENSIS (Bodd.).

Amaurornis phœnicura chinensis (Bodd.), Stresemann Nov. Zool., vol. xx, p. 304 (1913).

Amaurornis phœnicura (Forst.); Sharpe, tom. cit., p. 156; Robinson and Kloss, Ibis., 1911, p. 11.

Fairly common on Koh Samui; not noted on Koh Pennan.

"Iris chocolate, bill greenish yellow, orange on culmen, feet wax yellow"; wing 156, 154.

These specimens confirm Stresemann's diagnosis having the upper surface olive (less grey) and the rump strongly washed with bronze.

HELIORNITHIDÆ.

8. HELIOPAIS PERSONATA.

Heliopais personata (G.R.Gr.); Sharpe, tom. cit., p. 232; Bonhote, P.Z.S. 1901 (i), p. 79.

The Masked Finfoot is widely distributed throughout the Malay Peninsula in very varied situations from sluggish mangrove creeks to rapid mountain streams but is nowhere common. One of our Dyaks obtained a fine male specimen in full plumage on a small stream on Koh Pennan.

"Iris dark hazel, feet apple green with a tinge of blue, edges of lobes and soles yellowish, lobes black beneath. Bill chrome yellow, yellowish green on culmen, basal culminal process chrome yellow."

LARIDÆ.

9. STERNA DOUGALLI.

Sterna dougalli, Mont.; Howard Saunders, Cat. Birds Brit. Mus., xxv, p. 70 (1896); Robinson, Journ. Fed. Malay States Mus., ii, p. 9 (1906).

Terns were very common in the Strait between Koh Samui and Koh Pennan but generally kept far out to sea among the reefs. On a small island off Koh Pennan we obtained two beautiful specimens in full breeding plumage with the roseate tint of the under surface strongly developed and the streamers of the tail elongated. They were feeding amongst large numbers of the succeeding species. The only other specimens obtained within the limits of the Malay Peninsula are three shot in August on Pulau Jemor, a small island in the middle of the Straits of Malacca off the Selangor Coast.

10. STERNA MELANAUCHEN.

Sterna melanauchen, Temm.; Howard Saunders, tom. cit., p. 126; Robinson, Journ. Fed. Malay States Mus., v, p. 18 (1913).

Koh Pennan. In full breeding plumage at the end of May.

Very common along the whole of the east coast of the Malay Peninsula.

CHARADRIIDÆ.

11. SARCOGRAMMUS ATRINUCHALIS-

antea, p. 88.

Common on both islands on the rice-fields and open spaces.

"Iris brown, eye lappet and terminal half of bill carmine, lip of bill black, tarsi pale whitish yellow, feet greenish yellow."

12. OCHTHODROMUS PYRRHOTHORAX.

Ochthodromus pyrrhorthorax (Gould); Sharpe, tom. cit., p. 226; Robinson and Kloss, tom. cit., p. 12.

A male shot on Koh Pennan on June 1st, shows no signs of assuming breeding plumage.

13. ÆGIALITIS ALEXANDRINA.

Aegialitis alexandrina (Linn.); Sharpe, tom. cit., p. 275.

Very common on the sandy beaches of both islands and evidently about to breed though we did not obtain eggs or young.

14. DISSURA EPISCOPUS.

antea, p. 88.

Very common on Koh Samui.

"Male, iris, inner ring red, outer yellow, legs dirty claret red, bill base black, remainder maroon red, orbital skin black, rest of bare skin on head slatey, skin under wings scarlet orange."

ARDEIDÆ.

15. ARDEA SUMATRANA.

Ardea sumatrana (Raffles); Sharpe, Cat. Birds Brit. Mus., xxvi, p. 68 (1898); Robinson and Kloss, tom. cit., p. 14.

An adult female from Koh Pennan.

"Iris bright yellow, orbital skin greenish chrome, legs brownish, joints tinged with green, soles whitish yellow, bill black, lower mandible yellow at tip shading into white, chrome at base."

16. DEMIEGRETTE SACRA.

Demiegretta sacra (Gm.); Sharpe, tom. cit., p. 137; Robinson and Kloss, tom. cit., p. 15.

One from Koh Samui and another from Koh Pennan. The latter is in the grey phase and the former in the white, with a few dark feathers on the back and mantle and the tips of the greater wing coverts grey.

"Iris pale chrome, orbital skin greenish, tarsi and feet yellowish green, the soles orange, upper mandible greenish, the lower yellow.

17. ARDEOLA BACCHUS.

Ardeola bacchus (Bp.); Sharpe, tom. cit., p. 211; Robinson and Kloss, tom. cit., p. 15.

A female from Koh Samui is moulting into the breeding plumage and the new feathers on the crown and neck are bright chestnut. The dimensions however are small the wing being only 8.1 and the tarsus. 2.2. which agree with those of *A. grayi*. which also occur in the Peninsula.

"Iris lemon yellow, bill and orbital skin greenish yellow, tip of bill black, tarsi greenish yellow, feet deeper yellow."

18. ARDETTA SINENSIS.

Ardetta sinensis (Gm.); Sharpe, tom. cit., p. 227.

An adult male from Koh Pennan.

"Iris bright yellow, orbital skin and lores greenish yellow, bill yellowish white, the culmen brownish horn, tarsi and toes, chrome, with a slight greenish cast."

ANATIDÆ.

19. DENDROCYCNA JAVANICA.

antea, p. 89.

There were a few Whistling Teal on the rice-fields at Koh Samui.

"Male, iris hazel, orbital skin yellowish green, bill and feet dark slatey."

PHALACROCORACIDÆ.

20. PHALACROCORAX CARBO.

Phalacrocorax carbo (Linn.); Ogilvie Grant, Cat. Birds Brit. Mus., xxvi, p. 340 (1898).

A male in non-breeding plumage was obtained at Koh Pennan.

"Iris emerald, gular skin chrome, feet black, bill blackish, the culmen yellowish."

Though very rare in the south of the Peninsula Cormorants become much more abundant in the north; I have obtained it on the coast of Patani and we saw four specimens in Senggora Roads on our way

to Koh Samui. Tropical specimens are said to be smaller than those from northern seas. The one before us has the wing about 13.5 and the culmen 2.6 inches.

FALCONIDÆ.

21. SPIZÆTUS LIMNÆTUS.

Spizaetus limnaetus (Horsf.); Sharpe, Cat. Birds Brit. Mus., i, p. 272 (1874); Robinson and Kloss, tom. cit., p. 23.

Two females from Koh Pennan, one in the ordinary and the other in the melanotic phase.

22. SPILORNIS PALLIDUS.

antea, p. 90.

Rather more richly coloured than the specimen from the mainland.

"Female, iris bright yellow, bill and feet greenish lead, cere yellowish."

23. HALIASTUR INTERMEDIUS.

Haliastur intermedius Gurney; Sharpe, tom. cit., p. 314; Robinson and Kloss, tom. cit., p. 24.

The local form of the Braminy Kite is common everywhere along the sea coast and for some distance inland in open country.

24. HALIAETUS LEUCOGASTER.

Haliaetus leucogaster (Gm.); Sharpe, tom. cit., p. 307; Robinson and Kloss, tom. cit., 0.23.

Two adults and an immature bird were obtained on Koh Samui and Koh Pennan on both of which islands it was very common.

The immature specimen is in a somewhat peculiar stage of plumage resembling birds from Langkawi which we have, as I am now inclined to think incorrectly, referred to *H. leucocoryphus* (Robinson and Kloss, tom. cit., p. 24).

PANDIONIDÆ.

25. POLIOÆTUS ICHTHYÆTUS.

Polioætus ichthyætus (Horsf.); Sharpe, tom. cit., p. 452; Robinson and Kloss, tom. cit., p. 30.

An adult male from Koh Pennan.

CORACIIDÆ.

26. EURYSTOMUS ORIENTALIS.

Eurystomus orientalis (Linn.); Sharpe, Cat. Birds Brit. Mus., xvii, p. 33, pl. ii, fig. i (1892); Robinson and Kloss, Ibis., 1911, p. 32. Stresemann, Nov. Zool., xx, pp. 298-301 (1913).

A male and two females from Koh Samui and Koh Pennan belonging to the black-tailed form and therefore nearer to the true *E. orientalis* than to its subspecies. *E. orientalis calonyx* (c. f. Stresemann, loc. cit. *supra*).

"Male, bill and feet coral, tip of bill and claws brownish black, orbital skin brownish red, iris dark hazel."

UPUPIDÆ.

27. UPUPA INDICA.

Upupa indica, Reichenb. ; Salvin, Cat. Birds Brit. Mus., xvi, p. 10 (1892) ; Robinson and Kloss, tom. cit., p. 35.

Very common on Koh Samui but at the time of our visit in shockingly ragged and disreputable plumage.

"Male, iris hazel, bill black, pinkish at base, feet greyish, soles pinkish."

ALCEDINIDÆ.

28. PELARGOPSIS MALACCENSIS.

Pelargopsis malaccensis, Sharpe, Cat. Birds Brit. Mus., xvii, p. 103 (1892).

Rhamphuleyon capensis malaccensis, Oberholser, Proc. U. S. Nat. Mus., xxxv, p. 678 (1909).

Judging from Oberholser's (*loc. cit.*) monograph of the genus a male and two females from Koh Pennan would appear to belong to this race and not as might be expected to the more northern form *P. burmanica*, Sharpe.

All have a distinct brown pileum, though in one female, owing to abrasion of the feathers it is very much lighter than the others. The wing of the male measures 146 mm. and of the two females 146 and 145. The specimens are exactly matched by others from more southern localities.

"Female, iris dark hazel, bill dark coral red, more vermilion towards gape, dark maroon at tip, tarsi and feet vermilion, claws brownish horn."

29. HALCYON SMYRNENSIS.

antea, p. 92.

Common on both islands.

30. HALCYON ARMSTRONGI.

Halcyon armstrongi, Sharpe, tom. cit., p. 277, pl. vii, fig. 1 ; Robinson and Kloss, tom. cit., p. 34.

Halcyon humii, Sharpe, tom. cit. p. 281, pl., viii.

After again examining over fifty specimens of this Blue and White Kingfisher from all parts of the Malay Peninsula, including eleven from Koh Samui and Koh Pennan I am convinced that it is impossible to maintain the distinctness of the northern from the southern bird. The characters relied on by Dr. Sharpe are met with indifferently in specimens from the same locality and I do not think that the explanation put forward—viz., that in the south of the Peninsula the duller greener bird (*H. armstrongi*) is migratory, while the brighter form (*H. humii*) is resident can be supported by facts.

"Female, iris dark hazel, bill black, base of lower mandible pinkish, feet greyish brown."

MEROPIDÆ.

31. MEROPS SUMATRANUS.

antea, p. 92.

32. MEROPS PHILIPPINUS.

antea, p. 92.

Both Bee-eaters were common on Koh Samui, less so on Koh Pennan.

CYPSELIDÆ.

33. TACHORNIS INFUMATA.

Tachornis infumata (Selat.); Hartert, Cat. Birds Brit. Mus., xvi, p. 467 (1892); Robinson and Kloss, tom. cit., p. 38.

This little palm swift was very abundant after rain on both islands, but only one female was shot.

34. CYPSELUS PACIFICUS.

Micropus pacificus (Lath.); Hartert, tom. cit., p. 448.

Three from Koh Pennan.

35. COLLOCALIA MERGUIENSIS.

Collocalia francica, subsp. *merguiensis*, Hartert, tom. cit., p. 453.

Very common indeed on both islands breeding on some of the small islands between Koh Samui and the mainland, the nests being regularly collected by the Chinese. This race has not hitherto been recorded from the Malay Peninsula, the form occurring on the islands to the south being *C. f. inexpectata*, Hume.

CUCULIDÆ.

36. CACOMANTIS MERULINUS.

Cacomantis merulinus (Scop.); Shelley, tom. cit., p. 40; Robinson and Kloss, tom. cit. p. 40.

A single very immature specimen of undetermined sex from Koh Samui.

37. EUDYNAMIS ORIENTALIS.

Eudynamis orientalis (Linn.); Shelley, Cat. Birds Brit. Mus., xix, p. 322 (1891); Robinson and Kloss, tom. cit., p. 41.

Very common on both islands as on practically every other island of any size in the vicinity of the Malay Peninsula, though commoner in the winter months.

"Male, iris crimson, bill greenish slate, feet slaty, edges of scales yellowish."

38. CENTROPUS SINENSIS INTERMEDIUS.

antea, p. 93.

Five specimens from the islands agree with those from the mainland in the characters noted. The shortness and breadth of the tail is especially noticeable.

39. RHOPODYTES TRISTIS.

antea, p. 93.

Very common in secondary jungle on Koh Samui.

PICIDÆ

10. CHRYSOCOLAPTES GUTTICRISTATUS.

Chrysocolaptes gutticristatus (Tick); Hargitt, tom. cit., p. 448; Robinson and Kloss.

A male from Koh Samui. Fairly common in the interior of the islands especially on the *pinang* palms (*Areca catechu*).

41. LYGIPICUS CANICAPILLUS.

Lygipicus canicapillus (Blyth); Hargitt, Cat. Birds Brit. Mus., xviii, p. 322 (1890); Robinson and Kloss, tom. cit., p. 46; Robinson, Journ. Fed. Malay States Mus., v, p. 20 (1913).

Lygipicus pumilus, Hargitt, tom. cit., p. 321.

Of two males obtained on Koh Samui in May, one has the central rectrices entirely uniform, while the other has them spotted on both webs. The wing of both specimens is about 3.2 in. (80 mm.). I think therefore that *L. pumilus* whose range is overlapped both north and south by *L. canicapillus* has no claim even to sub-specific distinction.

PITTIDÆ

12. PITTA CYANOPTERA.

auten, p. 97.

One female from Koh Samui

"Iris dark hazel, bill black, feet flesh"

MUSCICAPIDÆ

43. CYORNIS SUMATRENSIS.

Siphia sumatrensis, Sharpe, tom. cit., p. 151.

Cyornis sumatrensis, Hartert, Nov. Zool., ix, p. 550 (1902); Robinson and Kloss, tom. cit., p. 51.

After a good deal of hesitation I have referred a large number of specimens obtained in both islands to this race, which does not seem very markedly differentiated from *C. tickellii* of Peninsular India and Burma, from which it is distinguished only by its slightly smaller size, and whiter abdomen, sharply defined from the rufous orange of the breast.

"Female, iris dark hazel, bill black, feet bluish flesh."

Mr. Seimund obtained a nest on Koh Penman on May 25th and shot the parent bird. The nest was placed in a crevice in a rock about six feet off the ground and is of the usual flycatcher type, a hemispherical cup about four inches in external and two in internal diameter, made of dead leaves and fragments of fern and lined with tendrils. The eggs were three in number and hard set. In shape they are blunt ovals and the shell is almost without gloss. The ground colour is olive grey clouded with mottlings of reddish brown which in two eggs is fairly evenly distributed over the shell and in third forms a zone at the larger end. The measurements are A 172 × 13.6; B 178 × 13.3; C 178 × 13.5 mm.

44. HYPOTHYMIS AZUREA.

antea, p. 99.

A male from each island ; not common.

" Iris carmine, bill and feet slatey black."

45. MUSCITREA GRISOLA.

Pachycephala grisola (Blyth.) (adow, Cat. Birds Brit. Mus., viii, p. 220.

Hyloterpe grisola (Blyth) : Sharpe, Hand-list Birds, iv, p. 312 (1903).

Muscitrea cinerea, Blyth, Journ. Asiat. Soc. Bengal, xvi, p. 122 (1847) ; Sharpe, Hand-list Birds, iii, p. 220 (1901).

Muscitrea grisola, Oates, Faun. Brit. Ind. Birds, ii, p. 30 (1890) ; Robinson and Kloss, tom. cit., p. 54.

This species was fairly common in a small patch of mangrove on the west side of Koh Samui and five specimens, one with the secondaries and inner primaries, earthy brown on the outer webs, were secured. The species is numerous along the coastal zone on both sides of the Malay Peninsula and on several of the islands, but is not met with inland. It appears to keep strictly to the mangroves.

46. TERPSIPHONE AFFINIS.

antea, p. 99.

Two males from Koh Samui.

" Iris emerald, feet lead grey, bill and eye wattle smalt blue, inside of mouth sage green."

CAMPOPHAGIDÆ

47. CAMPOPHAGA NEGLECTA.

antea, p. 101.

A pair from Koh Samui.

" Iris dark hazel, bill and feet blackish.

PYCNONOTIDÆ

48. ÆGITHINA TIPHIA.

antea, p. 101.

The Common Iora was fairly numerous on both islands.

49. IRENA PUELLA.

antea, p. 102.

Common on the hills of Koh Samui in the patches of old jungle.

50. MICROPS MELANOCEPHALUS.

Microtarsus melanocephalus (Gm.) ; Sharpe, tom. cit., p. 65.

Micropus melanocephalus, Robinson and Kloss, tom. cit., p. 57.

One of the few birds that was at all numerous in the patches of heavy jungle on the hills of Koh Samui,

51. PYCNONOTUS ANALIS.

Pycnonotus analis (Horsf.); Sharpe, tom. cit., p. 140; Robinson and Kloss, tom. cit., p. 57.

By no means common. One male was obtained on Koh Samui.

"Iris hazel, bill slatey black, feet greenish black."

52. PYCNONOTUS FINLAYSONI.

Pycnonotus finlaysoni (Strickl.); Sharpe, tom. cit., p. 144; Robinson and Kloss, tom. cit., p. 58.

Fairly common both on Koh Samui and Koh Pennan.

53. PELLORNEUM SUBOCHRACEUM.

antea, p. 103.

One of the commonest birds on Koh Samui; not shot on Koh Pennan, though it doubtless occurs there.

"Male, iris chestnut, bill horn, feet flesh."

54. TURDINUS OLIVACEUS.

antea, p. 103.

One of the few Babblers found on the coastal islands; fairly numerous on Koh Samui.

"Female, iris red-brown, bill greenish lead, feet brownish flesh."

55. MIXORNIS GULARIS, > RUBRICAPILLUS.

antea, p. 106.

Five specimens from Koh Samui and Koh Pennan agree with those from the Bandon mainland in not being typical *M. gularis* but intermediate between that form and *M. rubricapilla*. Two of these specimens are however nearer to the latter race having the streaks on the throat confined to the shafts of the feathers, the crown rusty ferruginous, not chestnut, the outer aspect of the wings olivaceous and the yellow supercilium very distinct. (cf. *Hume, Stray. Feath.* vi, p. 266, 267 (1878)). As in so many other cases we are at the meeting place of two local races and the individual characters have become very plastic.

The two specimens above noted have the soft parts recorded as follows: "Male, iris light hazel, bill lead, yellowish at edges, tarsi and feet greenish lead, yellowish on soles. Female, iris wax yellow, bill dark horn above, yellowish green below, the tomtia and edges yellow, skin at gape, wax yellow, feet greenish yellow, more yellow on soles."

• TURDIDÆ.

56. LARVIVORA CYANEA.

Erithacus cyaneus (Pall.) Seebohm, Cat. Birds Brit. Mus., v, p. 303; Robinson and Kloss, tom. cit., p. 64.

A nearly adult male was procured in dense jungle on the hills of Koh Samui on May 16th, showing that the species is probably resident.

"Bill black, livid flesh at base, feet pale flesh."

57. *COPRYCHUS MUSICUS*.

Copsychnus musicus (Raffles); Robinson and Kloss, tom. cit. p. 65.

Copsychnus saularis (partim); Sharpe, tom. cit., p. 61.

Not so numerous as further south.

58. *CITTOCINCLA MACBURA*.

antea, p. 108.

One of the commonest birds, especially in the jungle among rocks.

"Male, iris chestnut, feet pale flesh, bill black."

SYLVIIDÆ.

59. *ORTHOTOMUS ATRIGULARIS*.

antea, p. 108.

Common on both islands.

60. *ACROCEPHALUS BISTRIGICEPS*.

Acrocephalus bistrigiceps, Swinh.; Seeborn, tom. cit., p. 51.

Two female specimens were shot on Koh Pennan among high grass by one of the Dyaks on May 29th and 30th.

The species is new to the Malay Peninsula and the present locality is a considerable extension of its range, which has not hitherto been known to extend south of Tavoy in Central Tenasserim.

61. *PHYLLOSCOPUS BOREALIS*.

Phylloscopus borealis (Blas.); Seeborn, Cat. Birds Brit. Mus., v. p. 40 (1881); Robinson and Kloss, tom. cit., p. 65.

A female from the hills of Koh Samui dated May 15th, and a male from Koh Pennan, shot on May 30th. In both these specimens the pale wing bars formed by the light tips to the coverts are almost entirely lacking.

CORVIDÆ.

62. *CORVUS MACRORHYNCHUS*.

Corone macrorhynchus (Wagl.); Sharpe, Cat. Birds Brit. Mus., iii, p. 38 (1877).

Corvus macrorhynchus, Robinson and Kloss, tom. cit., p. 71.

The jungle crow was very common both on the islands and on the mainland; one was shot on Koh Samui to make certain of the identification.

DICRURIDÆ.

63. *DISSEMURUS PARADISEUS*.

antea, p. 109.

Common on the islands.

STURNIDÆ.

64. *EULABES INTERMEDIUS*.

Mainatus intermedius (A. Hay); Sharpe, Cat. Birds Brit. Mus., xiii, p. 66; Robinson and Kloss, tom. cit., p. 67.

Gracula javana intermedia, Stresemann, Nov. Zool., xix, p. 314 (1912).

This Mynah was very common on both Koh Samui and Koh Pennan and we obtain five specimens. All are to be referred to the

present race, which is only a subspecies of *E. javanensis*. The shape of the postocular patch of feathers varies and is in some specimens practically united to the feathers of the throat. Better characters for the discrimination of the race from the typical form are the smaller size and the more slender bill, the latter feature being especially well marked. The wings of four specimens range from 176-168 mm. while that of a skin from Trang is 162. A male *E. javanensis*, from Pulau Aor measures 186 mm.

"Male, iris dark hazel, bill orange-yellow at tip, feet and lappets cadmium yellow, the latter apple green beneath eye."

65. CALORNIS CHALYBEA.

Calornis chalybea (Horsf.); Sharpe, tom. cit., p. 143; Robinson and Kloss, tom. cit., p. 68.

Common everywhere

66. ANTHUS MALAYENSIS.

Anthus malayensis, Eytou, P.Z.S. 1839, p. 104; Robinson and Kloss, tom. cit., p. 74.

Anthus rufulus (partim) Sharpe, Cat. Birds Brit. Mus., p. 574 (1885).

Common on the rice-fields of both islands. The specimens obtained are in extremely worn plumage but are almost certainly this form.

"Male, iris dark hazel, bill yellowish horn, feet pinkish flesh."

PLOCEIDÆ

67. MUNIA ACUTICAUDA.

Uroloncha acuticauda (Hodgs.); Sharpe, Cat. Birds Brit. Mus., xiii, p. 356 (1885).

Very common amongst thealang and on the rice-stubbles of both islands and also on the mainland.

"Male, iris chestnut, bill lead, lower mandible paler, feet lead black."

NECTARINIDÆ.

68. ÆTHOPYGA CARA.

Æthopyga cara, Hume, *Stray Feath.*, ii, p. 473 (note) (1874).

Æthopyga siparaja (Raffles) (partim); Robinson and Kloss, tom. cit., p. 74.

This form which extends up the Burmese Coast to Pegu is only a race of the Malayan *Æ. siparaja* which occurs in the southern half of the Peninsula, Borneo, Java and Sumatra. The differences between the two forms are slight but the northern form (*Æ. cara*) always has the upper tail coverts greenish not violet, the yellow rump patch more lemon (less orange) the yellow bases to the scarlet feathers of the throat and breast less pronounced and the crown metallic greenish not violet. As Hume points out true *Æ. siparaja* has the

violet monstachial streak bordered below with black which is not the case with *Ae. cara*. The receipt of additional specimens enables me to state that the bird met with in Penang is *Ae. siparaja*, while that from Langkawi, Trang and Koh Samui is *Ae. cara*, the birds found in the Butang Archipelago are in intermediate.

Two male specimens were obtained on Koh Samui, where it was not very abundant.

"Iris dark hazel, bill black, lower mandible brownish, feet brownish black, soles whitish."

69. CYRTOSTOMUS FLAMMAXILLARIS.

Cinnyris flammaxillaris (Blyth); Gadow, tom. cit., p. 77.

Cyrtostomus flammaxillaris, Robinson and Kloss, tom. cit., p. 77.

Common among flowering shrubs on the shores of both islands.

"Male, iris hazel, bill and feet blackish, soles greenish yellow."

70. LEPTOCOMA HASSELTII.

Cinnyris hasselti (Temm.); Gadow, tom. cit., p. 67; Robinson and Kloss, tom. cit., p. 77.

One male from Koh Penan.

71. ANTHOTHREPTES MALACCENSIS.

Anthothreptes malaccensis (Scop.); Gadow, Cat. Birds Brit. Mus., ix, p. 122 (1884); Robinson and Kloss, tom. cit., p. 76.

Everywhere, where there were coconut trees.

DICÆIDÆ.

72. DICÆUM CRUENTATUM

Dicæum cruentatum (Linn.); Sharpe, Cat. Birds Brit. Mus., x, p. 15 (1885); Robinson and Kloss, tom. cit., p. 78.

Common on the coast of both islands.

REPTILES AND BATRACHIANS FROM BANDON, KOH SAMUI AND KOH PENNAN.

BY H. C. ROBINSON, C.M.Z.S., AND C. BODEN KLOSS, F.Z.S.

The small collection of Reptiles and Batrachians obtained in the Siamese Province of Bandon on the east side of the Malay Peninsula near its northern extremity and on the adjacent islands of Samui and Pennan includes, as was to be expected, a relatively large number of Tenasserim and Siamese forms. No new records for the Malay Peninsula were obtained though the places visited were quite unknown: but the collections, especially those from the islands, are of interest from the point of view of distribution. As Mr. Boulenger's recent volume summarizes all our knowledge of the reptiles, etc., of the Malay Peninsula it has been unnecessary to cite other references.

1. *Trionyx hurum*, Gray.

Boulenger, Vertebrate Fauna of the Malay Peninsula: Reptilia and Amphibia, p. 9 (1912).

A fresh-water turtle obtained at Kao Nawng, Bandon, is represented by the head only. Cranial characters however appear to indicate that it is a member of the above species which has only rarely been recorded from the Malay Peninsula.

2. *Cyclemys annandalei*, Boulenger.

Boulenger, op. cit., p. 19.

A young individual from Koh Pennan. Carapace 72 by 65 m.m.

3. *Cyclemys dhor* (Gray).

Boulenger, op. cit., p. 20.

A young individual was obtained at Ban Kok Klap, Bandon. Carapace 84 by 75 mm.

4. *Hemidactylus frenatus*, Dum. and Bibr.

Boulenger, op. cit., p. 41.

Three examples were collected on Koh Samui.

5. *Mimetoazon craspedotus* (Mocquard).

Boulenger, op. cit., p. 46.

This extremely rare reptile only known from Kina Balu, Borneo and Penang, appears to be fairly numerous on Koh Samui where nine specimens were obtained. It was found both in houses and on the stems of coconut palms and is diurnal in its habits.

6. *Gecko verticillatus*, Laur.

Boulenger, op. cit., p. 50.

Koh Samui, 2 examples.

Koh Pennan, 2 examples.

Common and apparently occasionally gregarious! No less than nine were seen together on one tree.

7. *Draco maculatus* (Gray).

Boulenger, op. cit., p. 58.

Nine examples from Koh Samui

8. *Draco cyanolæmus* Bouleng.

Boulenger, op. cit., p. 60.

Two specimens of this rare flying-lizard, recorded hitherto only from the mountains of the Federated Malay States, were obtained at Kao Nawng, Bandon. It has also been obtained in some numbers on the Adang Islands, north of Penang.

9. *Draco blanfordi*, Bouleng.

Boulenger, op. cit., p. 61.

Two individuals were collected at Kao Nawng, Bandon.

10. *Draco microlepis*, Bouleng.

Boulenger, op. cit., p. 62.

A single example was captured on Koh Pennan: it is also known locally from the mountains of Perak.

11. *Draco melanopogon*, Bouleng.

Boulenger, op. cit., p. 62.

One specimen was met with at Kao Nawng, Bandon.

12. *Gonycephalus borneensis* (Schleg.).

Boulenger, op. cit., p. 65.

Two examples of this fairly common lizard were obtained at Kao Nawng.

13. *Acanthosaura armata* (Gray).

Boulenger, op. cit., p. 68.

One specimen from Kao Nawng.

14. *Calotes versicolor* (Daud.).

Boulenger, op. cit., p. 71.

Six examples from Koh Samui and four from Koh Pennan.

15. *Calotes emma*, Gray.

Boulenger, op. cit., p. 72.

Two specimens were obtained on Koh Samui and three from Koh Pennan.

16. *Mabuia multifasciata* (Kuhl).

Boulenger, op. cit., p. 84.

Examples of the common sciuk were preserved from both Koh Samui and Koh Pennan.

17. *Lygosoma olivaceum*, Gray.
Boulenger, op. cit., p. 91.
 Three specimens from Koh Samui.
18. *Simotes cyclurus* (Cantor).
Boulenger, op. cit., p. 149.
 A single specimen from Koh Samui.
19. *Hypsirhina plumbea* (Boie).
Boulenger, op. cit., p. 160.
 One example from Koh Samui.
20. *Psammodynastes pulverulentus* (Boie).
Boulenger, op. cit., p. 173.
 An immature individual was obtained at Kao Nawng, Bandon.
21. *Rana tigrina*, Daud.
Boulenger, op. cit., p. 234.
 One specimen from Koh Penman.
22. *Rhacophorus leucomystax* (Gravenh.).
Boulenger, op. cit., p. 248.
 Three examples from Koh Penman.
23. *Microhyla achatina* (Boie).
Boulenger, op. cit., p. 261.
 One specimen of this little frog from Koh Penman.
24. *Callula pulchra*, Gray.
Boulenger, op. cit., p. 264.
 One example from Koh Penman.
25. *Bufo melanostictus*, Schneid.
Boulenger, op. cit., p. 272.
 Two specimens from Koh Penman.

TWO NEW ORCHIDS FROM THE PROVINCE OF BANDON, S.W. SIAM.

BY H. N. RIDLEY, C.M.G., M.A., F.R.S., LATE DIRECTOR OF GARDENS,
STRAITS SETTLEMENTS.

[The two new species described below were obtained on the mountain Kao Nawng in the province of Bandon, which is referred to *antea* p. 84. Owing to the unfavourable weather and the press of other work, botanical collecting was not attempted on this mountain but in addition to the two novelties the following species were also obtained.—H.C.R.]

OLEACEÆ.

1. JASMINUM LONGIFOLIUM, KING.

Kao Nawng, 3,500 feet. *Distrib.*—Malay Peninsula.

GESNERACEÆ.

2. DIDYMOCARPUS FLAVA, RIDLEY.

Kao Nawng, Bandon, 1,500 feet. No. 5783. *Distrib.*—Malay Peninsula.

ORCHIDEÆ.

3. DENDROBIUM PARVIFLORUM, ROBB. FIL.

Kao Nawng, Bandon, 1,500 feet. *Distrib.* - Burma.

Flowers white, with a faint yellow spot on lip. On trees.

Probably also *D. curviflorum*. Rolfe, but not Hooker's *D. kentrochilum* which Kranzlin refers to this species, the flowers of the latter being twice as large.

4. BULBOPHYLLUM LOBBII, LINDLEY.

Kao Nawng, Bandon, 1,500 feet. Exceedingly common in large masses round our camp at this elevation.

Not the variety or species *Siamense* but the true Javanese form.
Distrib.—

5. CŒLOGYNE TRICARINATA, *sp. nov.*

Rhizome woody branching, covered with stiff sheaths ovate polished, 4 mm. in diameter. Pseudobulbs elongate conic, 4 angled 7 cm. Leaves thinly coriaceous lanceolate acuminate acute narrowed to the base 20-21 cm. long, 3.5 cm. wide, midrib prominent and 4 nerves conspicuous, petiole distinct 4 mm. long. Scape from the top of the pseudobulb slender, basal portion 15 cm. nude. Bracteate portion 4 cm. long, bracts distichous lanceolate obtuse to subacute. Raceme slender flexuous 12-17 cm. long, internodes 2 cm. long. Predicels 7 mm. long. Sepals lanceolate acute 12 mm. long. Petals very narrow linear. Lip distinctly 3-lobed, 11 mm. long, side lobes large rounded at tip, midlobe much larger 6 mm. long, 5 mm. wide,

obovate broadly rounded at the tip, keels three, the two outer ones from the base to the midlobe, the median short in the middle, all strongly undulate, base of lip saccate. Column slender straight 5 mm. long. Clinandrium large margin wide toothed; stelia very distinct erect obtuse. Stigma large.

Kao Nawng, Bandon, 4,000 feet.

This differs from *C. elata*, Lindl. in its smaller flowers and distinctly 3-lobed lip, with 3 keels not 2 only.

6. *CHRYSOGLOSSUM ROBINSONII*, *sp. nov.*

Stem creeping, 16 cm. or more long, pseudobulbs slender conic-cylindric 1.5 cm. long erect purplish, 8 mm. apart. Leaf ovate acuminate herbaceous narrowed at the base to the petiole 10 cm. long, 3 cm. wide, petiole 6 mm. long. Scape 14 cm. tall slender with several papery sheaths at the base and one longer one in the middle. Flowers 4, bracts lanceolate long acuminate 1.1 cm. long 2 mm. wide at base (upper ones smaller). Pedicel slender 1.4 cm. long, 2 mm. wide at the base, laterals falcate with a short mentum, petals shorter similar in form, lip base narrow channelled, rather thick, limb 3-lobed, side lobes broad obovate rounded, mid-lobe triangular obovate emarginate, keels 2 semioval between the lobes, passing into elevated veins on the mid-lobe, with a median elevated vein with 2 short erect oblong processes at the base of the keels, whole lip 1 cm. long 9 mm. across at the widest part of the mid-lobe. Column slender curved 6 mm. long, side lobes triangular acute. Anther cap-shaped, apex retuse, rounded front margin broad rounded. Pollinia 2 waxy conic elongate, flat beneath, no disc. Rostellum broad, rounded, bi-lobed. Clinandrium with a denticulate elevated margin.

Kao Nawng, Bandon, 1,500 feet.

Resembling *C. vesicatum* of the Fiji Islands.

BURMANNIACEÆ.

7. *GYMNOSIPHON APHYLLUM*, BLUME.

Kao Nawng, Bandon, 1,200-2,000 feet. No. 5788. Flowers purplish blue. *Distrib.*—Malaya.

AROIDEÆ.

8. *SCINDAPUS SCORTECHINII*, HOOKER, fil.

Kao Nawng, Bandon, 4,000 feet. *Distrib.*—Mountains of the Malay Peninsula.

THE PLANTS OF KOH SAMUI AND KOH PENNAN.

BY H. N. RIDLEY, C.M.G., M.A., F.R.S., LATE DIRECTOR OF GARDENS,
STRAITS SETTLEMENTS

THE small collection of plants from the islands of the North-east coast of the Malay Peninsula made by Mr. H. C. Robinson shows that the flora has some affinity with that of the more southern part, with an admixture of more distinctly Siamese plants. The occurrence of *Rhuacophila* so far north is of some interest and extends its region considerably. Of the new species the most interesting is the *Trachelospermum*, allied to Himalayan and Chinese species.

RANUNCULACEÆ

1. CLEMATIS SMILACIFOLIA, WALL.

Koh Samui; Koh Pennan. No. 5716.

2. NARAVELIA LAURIFOLIA, WALL.

Creeping, flowers scented. Koh Samui. No. 5731.

DILLENIACEÆ

3. TETRACERA ASSA, DC.

Koh Samui. No. 5705.

4. TETRACERA FRAGRANS, RIDLEY.

Koh Samui. *Distrib.*—Southern Siam.

ANONACEÆ

* 5. ELLIPEIA PUMILA, KING.

Distrib.—Perak.

6. MITREPHORA ALBA, *sp. nov.*

A small tree, 40 feet tall, bark of branches grey. Leaves thinly coriaceous, lanceolate, apex acuminate, base rounded, smooth glabrous, 8-9.5 cm. long, 2.5-3 cm. wide, nerves fine, 10 pairs, elevate on both sides, finely reticulate, midrib elevate beneath, depressed above. Petiole 2 mm. long. Flowers white or pinkish white, in short racemes, pubescent. Bracts small ovate, raceme 2 mm. long. Peduncle and pedicels 5 mm. long each. Sepals ovate, subacute, hairy, 2 mm. Petals, outer, broadly ovate, base broad hairy on both sides, 1.5 cm. long and as wide; inner connivent, spatulate sub-trilobed, claw narrow, side lobes rounded, central one short sub-acute, hairy on both sides, 1.1 cm. long, 1.2 cm. wide across the lobes. Stamens very numerous, short oblong. Connective not wider than the tip of the anther, small truncate. Ovaries 6 conic hairy. Stigmas connate, glabrous. Torus rather tall, hairy.

Koh Samui, western side. No. 5717.

This species is most closely allied to *M. grandiflora*, Bedd. of South India. The inner petals, however, are much broader and more

nearly 3-lobed than in any other species. The stamens are distinctly those of a *Mitrephora*, otherwise in the shape of the inner petals and other points, it more resembles an *Oropheia*.

POLYGALACEÆ.

7. POLYGALA ARILLATA, BUCH. HAM.

A form with rather small coriaceous leaves, 2.5 to 3.7 cm. long by 1. to 1.3 cm. wide. Flowers small, 1.3 cm. long, all terminal and quite glabrous. A new record for this region. *Distrib.*—India.

PORTULACACEÆ.

8. PORTULACA QUADRIFIDA, LONN.

S.E. Koh Penman. No. 5770. Flowers yellow. A tropical weed.

HYPERICINÆÆ.

9. CRATONYLON FORMOSUM, BENTH AND HOOKER FIL.

Koh Samui. No. 5728.

GUTTIFERÆ.

10. GARCINIA MERGUENSIS, WIGHT.

Koh Samui.

Not a typical form, the leaves being intermediate in form between that species and *G. costata*, Benth. and Hooker fil.

TERNSTROEMIACEÆ.

11. SCHIMA NORONHÆ, REFINWARDT.

S.E. Koh Penman. No. 5758. *Distrib.*—Malaya.

MALVACEÆ.

12. SIDA ACUTA, ROXB.

Koh Penman. No. 5762

Distrib.—Eastern tropics. A common weed.

TILIACEÆ.

13. GREWIA UMBELLATA, ROXB.

Koh Samui. No. 5734.

14. GREWIA PANICULATA, ROXB.

Koh Samui (No. 5709) and Koh Penman.

Both common on the Malay Peninsula.

MALPIGHIACEÆ.

15. TRISTELLATEIA AUSTRALASICA, A. RICH.

Koh Penman. No. 5769. *Distrib.*—Malaya to Australia.

GERANIACEÆ.

16. IMPATIENS WRAYI, HOOKER FIL. (!).

Koh Penman.

I am doubtful as to this as the specimens have not preserved well. *Distrib.*—The Malay Peninsula.

RUTACEÆ.

17. *CLAUSENA EXCAVATA*, BURN.

Koh Samui. *Distrib.*—The Eastern Tropics.

18. *GLYCOSMIS RUPESTRIS*, RIDLEY.

Koh Samui. *Distrib.*—Kedah.

OLACINEÆ.

19. *OLAX IMBRICATA*, ROXB.

S.W. Koh Pennan. *Distrib.*—Burma, Malaya.

CELASTRINEÆ.

20. *HIPPOCRATEA FERRUGINEA*, KING.

Koh Samui. No. 5735. A climber, flowers greenish-brown.

A very imperfectly known plant, only previously collected in Penang. The disc of the flower is very thick and lobed: King describes the anthers as one-celled with transverse dehiscence; in these specimens they dehisce into four loculi. The pistil is pubescent.

21. *SALACIA FLAVESCENS*, KURZ.

Hills of Koh Samui. No. 5738.

Common in the Malay Peninsula.

RHAMNEÆ.

22. *COLUBRINA ASIATICA*, BRONG.

Koh Samui. No. 5707. Common on sea shores *Distrib.*—Indo-Malaya.

LEGUMINOSÆ.

23. *CROTALARIA SALTIANA*, ANDR.

Koh Samui. No. 5711. *Distrib.*—Indo-Malaya.

24. *DESMODIUM UMBELLATUM*, DC.

Koh Penan. No. 5766. *Distrib.*—Indo-Malaya.

MYRTACEÆ.

25. *RHODOMYRTUS TOMENTOSA*, WIGHT.

Koh Samui. No. 5703.

26. *RHODAMNIA TRINERVA* var *SPECTABILIS*, BLUME.

Koh Pennan. No. 5775.

A form with few flowers on pedicels 1.5 cm. long. Calyx 3 mm. and petals 4 mm. long. Most resembling a Tenasserim form.

27. *EUGENIA SIAMENSIS*, CRAIB.

Hills of Koh Samui. Flowers deep rose pink, anthers yellow. Undoubtedly Craib's Siamese plant but very like a thin narrow-leaved form of *E. macrocarpa*, Roxburgh.

28. *EUGENIA SUAVIS*, *sp. nov.*

A big tree, 75 feet tall, the bark of the branches light brown. Leaves coriaceous, lanceolate acute, bases cuneate, drying pale grey,

keel prominent below, depressed above, nerves about 11 pairs, prominent, inarching just within the margin, 15 cm. long, 3.5 to 4 cm. wide, petiole 1.5 cm. long, stout. Cymes large, lax, lateral on the branches below the leaves, 10 cm. long, 8 cm. across. Peduncles 2 to 5 cm. long, stout-angled, branches similar, the longest 5 to 6 cm. long, branchlets trichotomous, with about 6 sessile crowded flowers at the tip. Bracts deciduous. Calyx tube, infundibuliform, 2 mm. long, 4 mm. across. Petals connate, falling off in a rounded cap. Stamens short, nearly 5 mm. long. Style 5 mm. much longer than the calyx, slender.

Flowers scented, whitish.

Hills of Koh Samui. No. 5730.

This belongs to the Jambolana section and is allied to *E. operculata*, Roxb. but has larger spreading cymes and very different flowers.

MELASTOMACEÆ

29. SONERILA SUCCOSA. *sp. nov.*

Herbaceous leaves few, whorled at the top of the stems. Stems erect or ascending weak, 20-30 cm. long. Leaves ovate lanceolate to ovate, fleshy obtuse denticulate with short hairs on the teeth 2 to 6 cm. long, 1-4 cm. wide.

Nerves about 4 pairs, petioles 2-3 mm. long. Peduncles 4-8 cm. long. Flowers umbellate about 4 on pedicels, 3 mm. long. Calyx long, smooth narrow with acute points 5 mm. long. Petals 3 lanceolate acuminate 7 mm. long, 4 mm. wide, apparently white with rather long pink tips. Stamens 3, anthers elongate acuminate conic, orange, 7 mm. long, filaments short violet purple. Style as long, slender. Capsule smooth, goblet shaped infundibuliform with short acute lobes, 1 cm. long, 4 mm. wide.

Koh Pennan.

Nearest to *S. succulenta*, Stapf form Perak.

30. MEMECYLON EDULE VAR. OVATA. C. B. CLARKE.

Koh Pennan. No. 5749.

Flowers cobalt blue, turning lilac. *Distrib.*—Indo-Malaya.

LYTHRACEÆ.

31. PEMPHIS ACIDULA. FORST.

Koh Pennan. No. 5755. *Distrib.*—Burma and Ceylon to Malaya.

SAMYDACEÆ.

32. HOMALIUM GRIFFITHIANUM. Ktze.

Koh Pennan. No. 5748. *Distrib.*—Tenasserim to Kedah.

Small tree, about six inches in diameter. Flowers greenish-yellow, scented. Leaves small and glabrous.

RUBIACEÆ.

33. *OPHIORHIZA LANCEIFOLIA*, *sp. nov.*

Suffruticose, ascending branched 15 to 20 cm. tall, young parts scurfy.

Leaves equal, lanceolate acuminate at both ends, 6.5 cm. long, 5 to 10 mm. wide. Nerves 7 pairs curved glabrous. Stipules very small, reduced to short points. Peduncle slender, 2 cm. long branches of the cyme about 6, 1.5 cm. long to 2 cm. Flowers about 7 on a branch on pedicels under 1 mm. long. Calyx very short, campanulate, with small ovate obtuse lobes. Corolla 5 mm. long (drying red) tube stout hairy at the base of the 5 ovate lanceolate lobes which are as long as the tube. Stamens very short half the length of the corolla, filaments very short, anthers linear, tips notched, or stamens as long as the corolla, tips exsert at the mouth. Style as long as the corolla clubbed. Flowers white.

Hills of Koh Samui. No. 5739. A herb on rocks in the stream.

Nearest to *O. fruticosa*, Ridley of the limestone rocks of Selangor but the leaves are glabrous and the petiole and peduncle longer.

34. *HEDYOTIS PINIFOLIA*, WALL.

Koh Samui. No. 5741. Common in Malaya.

35. *RANDIA PENANGENSIS*, KING AND GAMBLE.

Koh Samui. No. 5743. *Distrib.*—Malay Peninsula.

36. *PRISMATOMERIS ALBIDIFLORA*, THW.

Koh Pennan. No. 5760. *Distrib.*—Indo-Malaya.

37. *CHASALIA CURVIFLORA*, THW.

Koh Pennan. Flowers whitish violet. *Distrib.*—Indo-Malaya.

38. *PSYCHOTRIA VIRIDIFLORA*, HOOKER, FIL.

Koh Pennan. No. 5778.

COMPOSITÆ.

39. *COSMOS BIPINNATUS*, CAV.

Koh Pennan. No. 5762. A tropical weed.

MYRSINÆÆ.

40. *ARDISIA SOLANACEA*, ROXB.

Koh Samui. No. 5746. *Distrib.*—Indo-Malaya.

EBENACEÆ.

41. *DIOSPYROS LANCEAEFOLIA*, ROXB.

Koh Pennan. Tree about 10 inches in diameter. Flowers white. *Distrib.*—Assam, Burma, Malay Peninsula and Sumatra.

APOCYNACEÆ

42. CERBERA ODALLAM, GAERTN.

Koh Samui (banks of mountain stream on granite) Koh Pennan. Tree 25 feet tall. *Distrib.*—Tropical Asia.

43. LOCHNERA ROSEA, RECHB. FIL.

Koh Samui. No. 5704.

Now established all along the Malay Coasts. Native of South America.

44. TRACHELOSPERMUM (§ AXILLARES) LAURIFOLIUM, *sp. nov.*

Erect shrub. Leaves opposite, coriaceous, lanceolate acuminate, base shortly cuneate, 14 cm. long, 3 cm. wide, nerves 9 pairs, prominent beneath, midrib depressed above, elevate beneath, petiole thick, 3 mm. long. Cymes axillary, peduncle thick 1-2 mm. long. Flowers 5-7, subumbellate, ~~petals~~ thick, 7 mm. long, glabrous. Bracts very small ovate rounded. Calyx 5-lobed, lobes rounded quite obtuse fleshy pubescent 2 mm. long, scales alternating with them short narrow lanceolate obtuse. Corolla tube 6-9 mm. long, cylindric glabrous, yellowish, lobes 5 contort, 6-9 mm. long, oblong obtuse broad pubescent on the upper face with stellate hairs. Stamens adnate to corolla mouth, exsert forming a cone, anthers lanceolate, outside pubescent with a terminal hair tuft, inside glabrous with a swollen boss at the back and a tuft of hairs on the connective, base of anther cells slightly divaricate. Ovary bilobed and four grooved at the top, which is pubescent. Style slender, stigma conic, coronal scales round the ovary in two series, the outer ones lobed and notched (5) alternate, the inner ones (10) simple obtuse and fleshy.

Koh Pennan. No. 5764.

This species differs from *T. axillaris*, Hooker fil. in its lanceolate coriaceous leaves and larger flowers with hairy petals.

ASCLEPIADACEÆ

45. TYLOPHORA FLAVESCENS, *sp. nov.*

A climbing herb with tomentose stems and leaves. Leaves herbaceous, ovate to ovate lanceolate, shortly cuspidate, base rounded slightly cordate 7 cm. long, 3 cm. wide, nerves 3 pairs inarching, slender petiole 5 mm. long, tomentose. Raceme axillary, peduncle 7-8 mm. long. Bracts linear very narrow. Pedicels slender 1 cm. long, all hairy. Sepals very narrow, linear acuminate hairy. Corolla glabrous, greenish yellow, lobes ovate acute, many nerved 8 mm. across. Corona lobes broad fleshy obovate with a strong keel on the inner face and a long obtuse tooth. Stamens carinate, anthers cordate, lobes rounded with a short free central filament. Pollinia 2 elliptic pale yellow, hardly waxy. Carrier very minute. Stigma capitate, flat at the top stellate.

Koh Pennan. No. 5751.

Allied to *T. asthmatica*, Wight, but differs in the tomentose stem and leaves and glabrous corolla and the narrower corona lobes which are long toothed and strongly keeled.

46. *TYLOPHORA ASTHMATICA*, WIGHT.

Koh Pennan. *Distrib.*—Indo-Malaya.

47. *HOYA GLOBIFLORA*, *sp. nov.*

Stems pale corky, 2 mm. in diameter. Leaves ovate subacute with rounded bases 6.5 cm. long, 3.5 cm. wide, nerves 3 pairs and nervules few visible when dry, one pair from the base ascending, the others short horizontal soon broken up, petiole very thick, 6 mm. long. Peduncles stout 3 to 4 cm. long, raceme 1 cm. long, stout, occasionally branched. Flowers innumerable forming a large globose umbel 4-5 cm. across when dry. Pedicels 1.5 cm. long. Sepals 5, short ovate obtuse. Corolla 1 cm. across waxy white a pink tinge, lobes ovate sub-obtuse. Corona large, upper lobe short erect tooth-like, lower ovate, spreading obtuse, apex emarginate above depressed. Staminal column short. Anther cells incumbent over the style apex. Pollen masses linear oblong straight blunt flattened, caudicles very minute (hardly any). Carrier small, triangular, dark brown.

Koh Pennan. No. 5756. Creeper.

48. *HOYA PARASITICA*, WALL.

Koh Samui. No. 5718. Common in the Malay Peninsula.

49. *DISCHIDIA HIRSUTA*, DC.

Koh Samui. *Distrib.*—Malaya.

LOGANIACEÆ.

50. *FAGEÆA OBLONGA*, KING AND GAMBLE.

Koh Samui. *Distrib.*—Malay Peninsula.

51. *FAGEÆA FRAGRANS*, ROXB.

Koh Pennan. *Distrib.*—Malay Peninsula.

CONVOLVULACEÆ.

52. *MERREMIA HASTATA*, HULLIER.

Koh Pennan. *Distrib.*—Malaya.

SCROPHULARINEÆ.

53. *STRIGA LUTEA*, LOUR.

Koh Pennan. No. 5702. Flowers pale yellow. *Distrib.*—Indo-Malaya.

ACANTHACEÆ.

54. *ERANTHEMUM MALACCENSE*, C. B. CLARKE.

Koh Pennan (typical form); Koh Samui No. 5714. The latter is the dwarfier form, which occurs at Chupeng in Perlis.

55. *RUELLIA REPENS*, LINN.

Koh Pennan. No. 5755. *Distrib.*—Tropical Asia.

50. *JUSTICIA FLABELLIGERA*, *sp. nov.*

A slender-stemmed herb, over 11 cm. tall, glabrous. Leaves thin, herbaceous subequal ovate shortly acuminate obtuse; base cuneate, shortly, often unequally, bilobed, with rounded points, 14 cm. long, 8 cm. wide. Nerves 7-9 pairs. Petiole 3 mm. Spikes 20 cm. long, slender subterminal elongate, floriferous nearly to the base. Flowers solitary, sessile opposite, very numerous over 40 in spike. Bracts foliaceous, green 5 mm. long, the petiole 3 mm. long, narrow, blade transversely elliptic apiculate, narrowed at the base, into the petiole. 2 mm. long, 3 mm. wide, 6 nerved with long hairs on the edge. Sepals linear, subulate 2 mm. long glabrous. Corolla greenish white 9 mm. long. Upper lip narrow, lanceolate obtuse, lower obovate obtuse rounded. Palate finely ribbed. Stamens 2, anther-cells ellipsoid separate, the lower one with a very short blunt spur. Capsule 1 cm. lobes lanceolate, gradually narrowed to the base, obtuse glabrous. Seeds 4, flat, discoid cordate, corky warted light brown, 3 cm. long.

Hills of Koh Samui. No. 5736.

Apparently a tall plant, with long spikes of small flowers and leafy bracts, somewhat spade shaped.

VERBENACEÆ.

57. *CALLICARPA LONGIFOLIA*, LAM.

Koh Samui. No. 5737. *Distrib.*—Malaya.

58. *CLERODENDRON PANICULATUM*, LINN.

Koh Samui. No. 5706. *Distrib.*—Malaya.

59. *CLERODENDRON CITRINUM*, *sp. nov.*

A bushy hardwood shrub about five feet tall. Leaves opposite, herbaceous obovate irregularly lobed base cuneate apex acuminate glabrous, 13 cm. long, 7 cm. wide. Panicle terminal lax 10 cm. long by 10 cm. wide. Pedicels short. Calyx lobes lanceolate pubescent 2 mm. long. Corolla pubescent 1.7 cm. long tube slender lobes rounded oblong, edges ciliate, lemon yellow. Stamens, filaments 4, 3 cm. long filiform, anthers oblong dorsifixed with a groove in the back.

Koh Pennan. No. 5753. Slightly scented.

Allied to *C. paniculatum*, Linn. differing in the colour of the flowers, which are pubescent and the cuneate leaf base. The leaves are scurfy pustular beneath.

LABIATÆ.

60. *ORTHOSIPHON STAMINEUS*, BENTHAM, VAR. with violet purple flowers.

Koh Pennan. No. 5761. *Distrib.*—Siam.

61. *GOMPHOSTEMNEA OBLONGUM*, WALL.

Koh Pennan. *Distrib.*—Malay Peninsula.

62. *LEUCAS ZEYLANICA*, R. BR.

Koh Samui. No. 5708. *Distrib.*—Tropical Asia.

APETALÆ.

LAURINEÆ.

63. *LITSEA AMARA*, BLUME.

West side of Koh Samui. Nos. 5722, 5742. Common in Malaya.

EUPHORBIACEÆ.

64. *ANTIDESMA GROESEMBILLA*, GAERTN.

Koh Pennan. No. 5759. *Distrib.*—Indo-Malaya.

ORCHIDEÆ.

65. *MICROSTYLIS SPECTABILIS*, *sp. nov.*

Whole plant, 50 cm. tall, with thick woolly roots, base of stem 10 cm. long covered with pale papery sheaths, cylindric. Leaves about 6 elliptic ovate acute 9-12 cm. long, 3-4 cm. wide, 3-5 nerved, petiole and sheath 5 cm. long. Raceme dense long, very many flowered. Bracts lanceolate acuminate deflexed 4 mm. long. Pedicels 4 mm. long. Dorsal sepal linear oblong obtuse 4 mm. long laterals semi-ovate obtuse 3-nerved twice as broad as the dorsal sepal.

Petals linear oblong obtuse little shorter than the dorsal sepal. Lip shorter than the lateral sepals, limb oblong ending in four linear acuminate teeth. Fovea large ovate with everted edges auricles lanceolate acuminate as long as the petals, all deep crimson. Column yellow large with rounded stelia, a broad rostellum, anther rather flat, shortly broadly ovate obtuse 2-celled, notched at the back. Pollinia narrowly pyriform.

Koh Pennan.

A very distinct plant of the *M. congesta* type with remarkably long auricles to the lip and a deep fovea with strongly evert margins.

66. *DENDROBIUM KUNSTLERI*, HOOKER, FIL.

Koh Samui. *Distrib.*—Malay Peninsula.

67. *BULBOPHYLLUM (CIRRHOPE TALUM) DENTIFERUM*, *sp. nov.*

Rhizome slender elongate covered with sheaths 7 mm. long, eventually breaking up into fibres. Pseudobulbs 7-12 cm. apart, cylindric, 4 cm. long. Leaf thinly coriaceous lanceolate, tip obtuse narrowed to the base 15 cm. long, 3-5 cm. wide. Scapes 8 cm. tall from the base of the pseudobulb with a few sheaths at the base. Flowers about 12. "spotted purplish magenta and white," pedicels slender 12 mm. Dorsal sepal ovate, edge denticulate with a few long hairs at the tip, 5 nerved 5 mm. long, laterals connate lanceolate glabrous tips very shortly free acute 13 mm. long, 3 mm. wide. Petals oblong 4 mm. long, blunt slightly falcate denticulate with a few hairs on the tip. Lip very narrow linear cylindric fleshy with a broader base. Column rather long with a long curved foot. Stelia oblong ending in a long seta.

West side of Koh Samui. No. 5719.

Allied to *B. rupicolum*, Ridley, and *B. curtisii*, Rolfe, but with a larger flower and narrower lip.

68. *CALANTHE ANTHROPOPHORA*, *sp. nov.*

Roots very stout, woolly. Leaves broadly lanceolate acuminate 35 cm. long, 9.5 cm. wide, nerves prominent 3, petiole 15 cm. long. Scape stout pubescent 55 cm. long, raceme many-flowered 11 cm. long. Bracts ovate acuminate lower ones 5 mm. long, 2 mm. wide, mucronulate pubescent, upper ones smaller, persisted. Pedicels 5.5 cm. pubescent. Sepals elliptic obovate mucronulate pubescent 5-nerved 11 mm. long, 6 mm. wide. Petals oblanceolate, 3-nerved much narrower. Lip 4-lobed, the lateral lobes linear oblong truncate 1 cm. long, 2 mm. wide, slightly enlarged at the tip, the base of the mid lobe linear 3 mm. long, lobes linear oblong truncate widely divaricate, 12 mm. long, 2 mm. wide. Callus of numerous papillae in three rows, spur slender, filiform pubescent, 3 mm. long. Column stout.

Hills of Koh Samui No. 5701. Flowers white tinged with purple the base of the lip with three orange ridges. Flowering in May.

Allied to *C. veratrifolia*, R. Bp. but with a curious 4-lobed lip with very narrow spreading lobes.

69. *CYMBIDIUM CAULESCENS*, *sp. nov.*

Stem ascending with thick roots, 6-7 cm. long densely covered with distichous lanceolate acute sheathing leaves 2 cm. long striate. Leaves at the apex of the stem thinly coriaceous lanceolate acute recurved, closely striate narrowed slightly at the base, 3.5 cm. long, 0.6 to 1 cm. wide. Raceme from the leaf axil, slender 12-14 cm. long base nude. Flowers 5 to 8 distant. Bracts lanceolate acuminate 1 cm. long. Pedicel slender 1.5 cm. long. Sepals lanceolate acuminate slightly falcate. Petals similar 1.5 cm. long, 3 mm. wide. Lip shorter, 3-lobed side lobes shortly free, rounded at the tip, mid-lobe lanceolate acuminate acute; keels 2 low thick on the disc ending abruptly on the mid-lobe. Column arcuate, winged half way down, 7 mm. long. Margins of clinandrium little elevate. Pollinia 2 obovoid.

Koh Samui.

Near *C. lancifolium*, Hooker, but with no pseudobulb and a long developed stem with narrow leaves.

70. *THELASIS MACROBULBON*, RIDLEY.

Koh Samui. No. 5727. *Distrib.*—Malay Peninsula.

71. *HOERMARIA DISCOLOR*, RIDLEY.

Koh Samui. *Distrib.*—Malay Peninsula.

SCITAMINEÆ.

72. *KÆMPFERIA PULCHRA*, RIDLEY.

Koh Samui, damp places on banks in jungle and on damp rocks. No. 5700.

Corolla lilac mauve with white throat.

LILIACEÆ.

73. GLORIOSA SUPERBA, LINN.

Koh Pennan. No. 5757. Flowers orange or partially chrome yellow. *Distrib.*—Tropical Asia.

74. RHUACOPHILA JAVANICA, BLUME.

Koh Samui. In marshy ground, scarce. *Distrib.*—Malaya.

ROXBURGHACEÆ.

75. STEMONA TUBEROSA, LOUR.

Koh Samui. On rocks. *Distrib.*—Cochin China, Siam and Malay Peninsula.

COMMELINACEÆ.

76. COMMELINA NUDIFLORA, LINN.

Koh Pennan. No. 5771. *Distrib.*—Cosmopolitan.

AROIDEÆ.

77. LASIA ACULEATA, LOUR.

Koh Samui.

78. ANADENDRUM MONTANUM, SCHOTT.

Koh Samui No. 5728. "Spathe ivory white." This certainly unusual as it generally dull green. *Distrib.*—Malay Peninsula.

CYPERACEÆ.

79. CYPERUS POLYSTACHYUS, LINN.

Koh Samui. *Distrib.*—Cosmopolitan.

80. SCIRPUS BARBATUS, BOECK.

Koh Samui. *Distrib.*—Tropics generally.

GRAMINEÆ.

81. SETARIA GLAUCA, BEAUV.

Koh Pennan. *Distrib.*—Cosmopolitan.

82. ISCHÆNUM MUTICUM, LINN.

Koh Pennan and Koh Samui. No. 5711. *Distrib.*—Tropical Asia.

83. POGONATHERUM POLYSTACHYUM, KUNTH.

Koh Samui. *Distrib.*—Tropical Asia.

84. ARUNDO KARKA, RETZ.

Koh Samui. No. 5715. *Distrib.*—Tropical Asia.

FILICES.

85. DAVALLIA SOLIDA, SWARTZ.

Koh Samui. No. 5713. *Distrib.*—Tropical Asia.

LYCOPODIACEÆ.

86. PSILOTUM TRIQUETRUM, Sw.

Koh Pennan. No. 5754. *Distrib.*—Tropical Asia.

LIST OF A SMALL COLLECTION OF MAMMALS AND BIRDS FROM THE KRAU RIVER, WESTERN PAHANG.

By HERBERT C. ROBINSON AND C. BODEN KLOSS.

IN October, 1913, a small collecting party was despatched to Eastern Pahang with instructions to search for the rare Argus Pheasant *Rheinwartius ocellatus nigrescens*, Hartert, which was originally obtained on the Benom massif by Waterstradt's Dyak collectors and was subsequently found to be not uncommon on the lower slopes of Gunong Tahan.

Owing however to bad weather and the impossibility of obtaining transport our party only ascended the Krau river for a couple of days in boats and the collections, therefore, only represent the fauna of the outer and lower foot-hills.

A few of the species obtained are, however, local and rare, and the list is therefore given in full.

The reference cited is to a previous paper by Kloss in this Journal on the Mammals and Birds of Pahang. (Vol. iv, pp. 152-166.)

MAMMALS.

1. MACACA IRUS (F. CUVIER).

2 ♂.

2. TRAGULUS CANESCENS, MILLER.

1 ♂, 1 ♀.

3. TRAGULUS RAVUS, MILLER.

Kloss, p. 146.

1 ♂, 1 ♀.

4. RATUFA MELANOPEPLA, MILLER.

3 ♂.

5. SCIURUS PREVOSTII, DESM.

Kloss, p. 148.

1 ♀.

The specimens illustrate the first stage of *S. prevostii* towards its form *S.p. wrayi*, Kloss; the upper part of the fore limb and a portion of the lateral stripe being faintly washed with fulvous.

6. SCIURUS CONCOLOR, BLYTH.

Kloss, p. 149.

1 ♀.

7. SCIURUS MINEATUS.

Kloss, p. 149.

1 ♂.

9. *SCIURUS TENUIS*, HOBBST.

Kloss, p. 150.

4 ♂, 1 ♀.

9. *SCIURUS ROBINSONI ALACRIS*, THOS.

Kloss, p. 150.

1 ♂, 1 ♀.

10. *LARISCUS JALORENSIS*, BONH.

Kloss, p. 150.

7 ♂, 7 ♀.

11. *RHINOSCIURUS TUPAIODES*, GRAY.

Kloss, p. 150.

2 ♂.

12. *EPIMYS VOCIFERANS* (MILLER).

Kloss, p. 151.

2 ♂, 1 ♀.

13. *EPIMYS PELLAX* (MILLER).

Kloss, p. 151.

1 ♀.

14. *EPIMYS ASPER* (MILLER).

Kloss, p. 151.

1 ♀.

15. *TUPAIA GLIS FERRUGINEA*, RAFFLES.

Kloss, p. 152.

3 ♂, 1 ♀.

16. *TUPAIA MALACCANA*, ANDERSON.

Kloss, p. 152.

4 ♂, 3 ♀.

17. *RHINOLOPHUS TRIPOLIATUS*, TEMM.

1 ♂.

BIRDS.

PHASIANIDÆ.

1. *RHIZOTHERA LONGIROSTRIS* (TEMN.).

1 ♂, 2 ♀.

Evidently fairly common.

2. *POLYPLECTRON MALACCENSIS* (SCOP.).

1 ♂, 1 ♀ imm.

A characteristic lowland and swampy jungle bird.

3. *ARGUSIANUS ARGUS* (LINN.).

Kloss, p. 152.

1 ♂.

FALCONIDÆ.

4. *MICROHIEAX FRINGILLARIUS* (DRAP.).

Kloss, p. 153.

2 ♂, 1 ♀.

STRIGES.

5. KETUPA KETUPA (HORSF.).

1 ♀.

PSITTACI.

6. PSITTINUS INCERTUS (SHAW).

Kloss, p. 153.

1 ♀.

ALCEDINIDÆ.

7. CEYX TRIDACTYLA (PALL.).

Kloss, p. 154.

1 ♀.

8. CEYX EUERYTHRA. SHARPE.

Kloss, p. 154.

1 ♂, 2 ♀.

9. HALCYON CONCRETUS (TEMM.).

Kloss, p. 154.

1 ♂, 1 ♀.

MEROPIDÆ.

10. MEROPS SUMATRANUS (RAFFLES).

Kloss, p. 154.

1 ♂, 1 ♀.

CAPRIMULGIDÆ.

11. LYNCORNIS TEMMINCKI, GOULD.

1 ♀.

CYPSELIDÆ.

12. CHÆTURA LEUCOPYGIALIS, BLYTH.

Kloss, p. 154.

1 ♂.

TROGONIDÆ.

13. PYROTROGON KASUMBA (RAFFLES).

1 ♂.

14. PYROTROGON DUVAUCELI (TEMM.).

Kloss, p. 154.

1 ♂.

15. PYROTROGON ORROPHLEUS CAB. AND HLINE.

1 ♂.

After many years collecting, this species, which has not hitherto been represented in any of the local collections, has at last turned up. It is probable that it is confined to the south of the Peninsula where we have done comparatively little collecting and does not extend north of the territory of Malacca where Hume's collectors found it comparatively common. It is separated at a glance from *P. duvauceli* by its larger size, the entire absence of scarlet on the rump, the duller colour of the under surface and the narrower white

vermiculations on the wing coverts. It can hardly be regarded as a sub-species of *P. duvauceli* as that species occurs throughout the districts occupied by the present form.

Moulton in *Journ. Straits Branch Roy. Asiat. Soc.* No. 67, p.p. 151 (1914) regards *Pyrotrogon vidua* (Ogilvie Grant) as a very doubtful sub-species of this bird which is also recorded from Central Borneo by Buttikofer. The birds described by Grant as *Harpactes vidua* in *Cat. Birds Brit. Mus.* XVII, p. 501 (1892) came from Mounts Kinabalu and Dulit in N. W. Borneo.

CUCULIDÆ.

16. HIEROCOCCYX NANUS, HUMER.

Shelley, *Cat. Birds Brit. Mus.*, xvii, p. 238 (1892).

A nearly adult male agrees well with Hume and Shelley's description of this rare cuckoo, which is new to the Federated Malay States Museums. Wing, 5.6; tail, 5.5 in.

17. CACOMANTIS MERULINUS (SCOP.).

Kloss, p. 155.

1 ♀.

18. UROCOCYX ERYTHROGNATHUS (HARTL.)

Kloss, p. 152.

1 ♀.

CAPITONIDÆ.

19. CHOTORHEA MYSTACOPHANES (TENN.).

Kloss, p. 155.

1 ♂.

PICIDÆ.

20. PTERHOPICUS PORPHYROMELAS (BOIE).

1 ♂, 1 ♀.

21. MICROPTERNUS BBACHYURUS (VIEILL.).

Kloss, p. 156.

1 ♀.

22. CHRYSOPHLEGMA HUMII, HARGITT.

Kloss, p. 156.

2 ♂.

23. SASIA EVERETTI, HARGITT.

Kloss, p. 157.

1 ♂, 1 ♀.

EURYLÆMIDÆ.

24. CALYPTOMENA VIRIDIS, RAFFLES.

Kloss, p. 157.

1 ♂.

PITTIDÆ.

25. PITTA CÆRULEA, RAFFLES.

1 ♂.

This fine species, though generally distributed throughout the length of the Peninsula, is everywhere rare; it is generally met with in low and swampy country.

26. *PITTA COCCINEA*, EYTON.

2 ♂.

Fairly common in low and swampy forest.

27. *PITTA CUCULLATA*, HARTL.

1 ♂, 6 ♀.

Common throughout the Peninsula in the winter months and, partially at any rate, migratory.

28. *EUCICHLA BOSCHII*, MÜLL. AND SCHLEG.

Kloss, p. 158.

2 ♂, 2 ♀, ♀ imm.

Collections made since the date of Kloss's note show that this species is fairly common throughout Western Pahang, frequenting the drier portions of the lower country forests especially near the limestone hills. The specimens ascribed to "Malacca" in the old trade collections from that settlement were probably obtained in the Triang or other districts of Western Pahang.

MUSCICAPIDÆ.

29. *PHILENTOMA VELATUM* (TEMN.).

1 ♂, 1 ♀.

30. *RHINOMYIAS PECTORALIS* (SALVAD.).

Kloss, p. 159.

1 ♂.

The question of the proper name for this much discussed species is shrouded in much confusion and must be deferred for the present. There are, at any rate, at least two applicable names earlier in date than that of Salvadori.

31. *ERYTHROMYIAS MUELLERI* (BLYTH).

Kloss, p. 158.

1 ♀.

Normally a submontane bird, only occasionally found at low elevations.

CAMPOPHAGIDÆ.

32. *PERICROCOTUS CINEREUS*, LAFR.

1 ♂, 2 ♀.

A winter visitor only to the Malay Peninsula.

PYCNONOTIDÆ.

33. *CHLOROPSIS ICTEROCEPHALA* (LESS.).

Kloss, p. 159.

1 ♂, 1 ♀.

34. *PYCNONOTUS SALVADORII*, SHARPE.

Kloss, p. 161.

1 ♀.

35. *TRACHYCOMUS OCHROCEPHALUS* (GM.).

Kloss, p. 160.

1 ♂, 1 ♀.

Common everywhere along the banks of the larger rivers.

36. *RUBIGULA WEBERI* (HUMPS).

4 ♀.

Very local but usually abundant wherever met with.

TIMELIIDÆ.

37. *TURDINUS OLIVACEUS* (STRICKL.).

Kloss, p. 161.

1 ♀.

38. *TURDINUS MACRODACTYLUS*, STRICKL.

Kloss, p. 161.

4 ♂, 2 ♀.

39. *ERYTHROCICHLA BICOLOR* (LESS.).

Kloss, p. 161.

1 ♂, 1 ♀.

40. *ANUROPSIS MALACCENSIS*, HARTE.

Kloss, p. 162.

1 ♂, 1 ♀.

41. *DRYMOCATAPHUS NIGROCAPITATUS* (EYTON).

Kloss, p. 161.

1 ♂, 1 ♀.

42. *STACHYRIS POLIOCEPHALA* (TEMN.).

Kloss, p. 162.

2 ♂, 1 ♀.

The preceding six species are all extremely common in heavy jungle throughout the Peninsula, away from the coastal zone up to about 2,000 feet in elevation.

43. *STACHYRIS LEUCOTIS* (STRICKL.).

1 ♂, 1 ♀.

Decidedly local and not found in the more northern parts of the Peninsula; we have only found it common on the hills of Negri Sembilan.

44. *KENOPIA STRIATA* (BLYTH).Kloss, *antea.*, vol. iv, p. 232.

2 ♂, 1 ♀.

Except apparently in the south of the Peninsula, this is a decidedly rare species throughout our area. In addition to the specimens cited by Kloss it has recently been found not uncommon at Rawang, in the low country of Selangor.

TURDIDÆ.

45. *HYDROCICHLA RUFICAPILLA* (TEMN.).

Kloss, p. 163.

2 ♂.

Exceedingly common on clear water streams in old jungle.

46. *HYDROCICHLA FRONTALIS* (BLYTH).

Kloss, p. 163.

1 ♀.

Very much rarer than the preceding.

47. *LARVIVORA CYANEA* (PALL)

1 ♂, 1 ♀.

LANIIDÆ.

48. *HEMIPUS OBSCURUS* (HOESE).

Kloss, p. 164.

1 ♀.

49. *PLATYLOPHUS ARDESIACUS*, CAB.

Kloss, p. 164.

1 ♂, 2 ♀.

DICRURIDÆ.

50. *CHAPTIA MALAYENSIS* (HAY).

Kloss, p. 164.

1 ♂.

51. *DISSEMURUS PARADISEUS* (LINN.).

Kloss, p. 164.

1 ♂.

ORIOOLIDÆ.

52. *ORIOIUS ZANTHONOTUS*, HOESE.

1 ♂.

NECTARINIIDÆ.

53. *ETHOPYGA TEMMINCKI* (S. MILL.).

1 ♂.

The only district in the Malay Peninsula where this beautiful sun-bird is at all common is the hill country of Negri Sembilan, though it has also been found on Bukit Kutu in Selangor, the Taiping Hills in Perak, and in the Siamese State of Trang. In the mountains of Western Sumatra it is very abundant.

54. *ARACHNOTHERA LONGIROSTRIS* (LATH.).

Kloss, p. 166.

1 ♂.

55. *ARACHNOTHERA ROBUSTA*, MÜLL AND SCHLEG.

1 ♂.

The rarest of the genus in the Malay Peninsula. With the exception of a small series from Trang we only possess two other specimens, from Ulu Gombak and Dusun Tua, both in the State of Selangor.

DICÆIDÆ.

56. *PRIONOCHILUS MACULATUS*, TEMM.

Kloss, p. 166.

1 ♂.

NOTES ON THE ABORIGINAL INHABITANTS OF IJOK IN THE DISTRICT OF SELAMA, PERAK.

By IVOR H. N. EVANS, B.A., ASSISTANT F.M.S. MUSEUMS.

(PLATE XVI).

THE following notes on the aborigines of Ijok in the Selama * District were made during the months of April and May, 1913. Perhaps one of the most noteworthy facts with regard to these people is that although they are in close contact and intercourse with the aborigines of Lenggong, Sumpitan, and Kuala Kenering—Sumpitan being only some eleven miles distant from Ijok—they nevertheless speak a somewhat different dialect the speech of the Lenggong people belonging to the group of dialects generally termed Northern Sakai, while that of the aborigines of Ijok is classed as Semang, (Western Negrito). Both tribes, however, are similar in physical appearance and are undoubtedly of Negrito origin,† though it is possible that there may be a slight strain of Sakai blood among them. Inter-marriage between members of the two divisions appears to be now common. The Ijok people said that, though having but little intercourse with either, they were related in speech to the aborigines of both Selama and Kupang, the latter presumably the river of that name not far from the Kedah boundary: in this they are probably correct, as the Negritos of Kedah all speak dialects belonging to the Semang group, as do those of Selama itself.

The Ijok Semang showed no fear of the writer and, if not sent for after a few days, used to come in to ask if they were not wanted; of course with the idea of obtaining food and presents. They seemed to be truthful in their replies to questions though all information obtained was checked as far as possible by questioning three or more individuals.

HABITATIONS.

The Semang settlement was situated near the Chinese mine at Klian Gunong, about four miles from Ijok. The majority of the huts were of the same type as those seen on a former visit to Lenggong (see Journ. Fed. Malay States Mus., p. 64, No. 2, Vol. V; 1914). Each hut consisted of an arch-shaped framework of bent saplings with cross pieces connecting them horizontally. This structure was covered with a thatch of *tepus* leaves, and one end of the arch was usually stopped with a mat of palm leaves on a slight framework of sticks, the open end being used as a door.

* Selama village is some 18 miles from Ijok.

† The Ijok people, however, until very recently represented as pure a strain of Negrito as is to be met with in the Malay Peninsula. The Lenggong people on the other hand have a very much larger admixture of Sakai blood. H.C.B.

The floor of the hut was partly occupied by a slight sleeping platform consisting of a sheet of split bamboo raised about a foot from the ground on a framework of small tree boughs. The rest of the hut floor with the exception of the hearth, where there was a fire of logs, was bare. Dart quivers and various small articles, such as food stirrers and porcupine quills used in mat making, were stored on the under side of the thatch, larger utensils such as cooking pots were ranged along the wall of the hut. Each married couple occupied a single hut with a slightly larger sleeping platform than that used by a bachelor. The only other type of dwelling noticed was the simple wind-shelter consisting of a sloping palm leaf thatch resting on a rectangular framework of small branches, the whole being supported in front by two posts about $4\frac{1}{2}$ ft. high with a fork at the top of each to hold the uppermost bar of the frame.

PHYSICAL CHARACTERISTICS.

The physical appearance of the Ijok people did not seem to differ to any extent from that of the Semang of Lenggong. The stomach, specially in children, was often protruberant, though the body generally was but poorly nourished. This may possibly be due to the food, when obtainable, being gorged in large quantities. The skins of most of the men and women appeared to be of a dark chocolate colour, but this was at least partly due to dirt. One young man, aged about 20 or 21, was very fairly and powerfully built and had an open and pleasant countenance, which in spite of its rather rounded forehead, low bridged nose and broad nostrils could almost be termed handsome. His skin was also rather lighter than that of the others and his body by no means unclean. Both men and women age quickly and atrophy of the muscles of the body seems to set in much more quickly than in the average European. The hair of most of the individuals seen had the peppercorn structure well developed, and the Semang themselves seem to realize that this is a racial feature, as is shown in the legend of their origin given below.

PERSONAL CHARACTER.

The remarks made in a former paper with regard to the personal character of the aborigines of Lenggong apply equally well to the people of Ijok. They have been anything but improved by constant intercourse with the Malays and Chinese, to whom they are by way of becoming hewers of wood and drawers of water. Their dependant condition has developed in them certain traits which are deplorable. They are the most inveterate beggars and ask without scruple for anything they see or want. They are also said not to be above obtaining advances of goods from either Chinese or Malays on account of rattans, ataps or other jungle produce which they promise to bring in in payment and failing to complete the bargain. In an affair of this kind it is probably a case of the "biter getting

bitten," at any rate so far as the Malay is concerned, for he is notoriously unscrupulous in his dealings with the aborigines. The Chinaman has a better name for fair dealing than the Malay, but even he probably takes care to make his cent. per cent. over every transaction. Two of the Ijok people were opium smokers, one an old man, the head of the tribe, the other a young fellow of nineteen or twenty. They seem to obtain supplies of the drug either from the miners at Klian Gunong or else from some shops a little further down the valley.

DRESS AND ADORNMENT.

The men all wore loin-cloths or chawats of European-made cloth as their sole garment, but several of them were decorated with bracelets of *akar batu*, and necklaces of the same material, the strands being tied together in a knot in front. Strings of glass beads worn crossed over the breast were also popular, and one young man had a regular collar formed of a long string of beads wound round and round the neck. The women all affected short skirts made from the common cotton sarongs worn by the Malays. Two forms of woman's dress of purely Negrito type were, however, obtained, though not seen in use; one was a short skirt of *akar batu* the other a similar garment made of narrow strips of *tirap* bark depending from a string of the same material. Two long necklaces of lotong monkey teeth interspersed with small glass beads were also purchased. These are worn by the women or children. The writer made enquiries as to the use of bark-cloth T-bandages, but was told that they were no longer worn: one of the men, however, in order to show that bark-cloth could still be made manufactured a loin-cloth from *ipoh* bark and another from *tirap* bark and brought them in to sell. Women's combs of bamboo decorated with typical Negrito patterns were common, and five specimens were purchased. One or two bracelets of plaited rattan were also collected as well as a pair of armlets of spirally twisted brass wire. The latter were, however, said to have been obtained from the Orang Bukit (i.e., from one of the trans-Perak River Semang-Sakai tribes.)

WEAPONS.

The weapons in use among the Semang of Ijok do not differ in any particular from those of the people of Lenggong. The blow-pipes of their own manufacture always have the inner tube composed of two sections of bamboo placed end to end, and united by a covering section of the same material over the joint. Blow-pipes with the inner tube made from a single section of bamboo are occasionally to be seen, but these are procured from other tribes. The mouth-piece of all the blow-pipes examined was spheroidal and composed either of wood, or of wood with a covering of "getah" (rubber of some sort). The outer tubes were either not decorated at all, or had merely a few incised circles running round them at the

top and bottom. The bamboo of the outer tube was, in old specimens, of a warm red brown hue, this colour being acquired by frequent polishing with damar gum or oil, and continual smoke drying when not in use, it being customary to keep the blow-pipe on the under side of the thatch of the hut, where it is constantly in the smoke of the open fire. When thus out of use both ends of the tube are kept carefully plugged with down to prevent the entry of mud-wasps, ants, or other insects. The dart-quivers were of true Negrito type, being made from a single internode of bamboo with one septum left untouched to form the bottom of the receptacle. When in use the top, which is coverless, is often plugged with leaves. New internodes cut for the manufacture of dart-quivers are dried by filling them with hot wood ashes from the fire, but the pattern design is generally roughly scratched in first. Bamboo receptacles rather larger than the ordinary quivers are used for holding large spatulæ of *ipoh* poison, but smaller spatulæ are often found in the true quivers. These larger receptacles are also sometimes used for holding darts. A few experiments were made to test the range of the blow-pipe, and it was found that a man squatting on his haunches and holding his blow-pipe horizontally could easily shoot a dart a distance of 65 feet. A piece of white paper set on a stick as a mark at this distance was not hit in three or four attempts, but the Semang complained that they could not do themselves justice owing to the fact that previous to shooting they had broken off all the poisoned points of their darts as the trial had to take place along the bridle path, the only convenient place which could be found. This precaution was wise, as numbers of Malays quickly turned out to see what was going on. The practice took place on an almost windless day and shooting was tried in two directions. The Semangs' remarks about darts with broken points not flying true was probably quite justifiable, as the dart stem is considerably thicker just above the point than at any other place. Above this thickening in the direction of the head a small groove is cut in order that when an animal is stuck the dart may break off and leave the poisoned head in the wound. It was interesting to note the way in which the blow-pipe was treated in preparing for a shot. The performer first seized it with his right hand at the mouth-piece and with his left a little way up the stem, grasping it between the first and second fingers of the latter: using the right hand he then drew it several times smartly backwards and forwards between these two fingers meanwhile keeping in the dart which had been already inserted, by means of the right hand. Then squatting suddenly he grasped the weapon close to the end between the interlaced fingers of both hands and taking aim expelled the dart. The method employed of holding the blowpipe seems to be common to all the aborigines of the Peninsula or at any rate to all those using the bamboo blowpipe. The stem of the instrument rests partly on the upturned palms of the hands. Among the

Kayans, Dusuns and other blow-pipe using tribes of Borneo, where the blow-pipe is in use, the instrument is also grasped close to the mouth-piece but the right hand is placed above the left and both have their backs directed upwards.

MUSICAL INSTRUMENTS.

The only musical instruments seen were the bamboo stamper, the bamboo jews' harp and a peculiar kind of earth-drum made by digging a hole about a foot and a half square in the ground and stretching tightly over it a piece of tree bark tied between two short posts driven into the earth one on either side of the hole.

OTHER MANUFACTURES.

Besides weapons, articles of dress, and musical instruments the Negritos appeared to possess very few articles of their own manufacture; rough mats made of some species of *Pandanus* were, however, fairly common, while porcupine quills, indistinguishable from those worn in the nose, were used as implements in making them. Graters, for shredding the tubers of jungle yams and made from the stems of a kind of rattan (*rotan seni*) with the thorny spathe still adhering were in use, as were also small wooden pestles and mortars for pounding up condiments. *Pandanus* pouches for holding tobacco or the materials for betel chewing were common: one rather fine specimen with an inner lining of the same material and ornamented on the outside with black patterns was obtained for the Museum.

RELIGION, SUPERSTITION AND LEGENDS.

As among the aborigines of Lenggong, enquiries as to the existence of any definite forms of religious belief were productive of purely negative results, but while questioning the Semang as to their explanations of several common natural phenomena a little interesting information was obtained and also a single legend. The latter is not new, but the Ijok form is given below, as it differs from other versions in a few particulars.

LEGEND OF THE ORIGIN OF THE SEMANG.

TOLD BY THE HEADMAN OF THE SEMANG.

"Our origin was the same as that of the Malays.

"Once upon a time the King of the Mawas* monkeys, Rajah Mawas, fought with the King of Siamang† monkeys, Rajah Siamang, in the country where our ancestors lived. Our ancestors ran away from the place they lived in, being frightened by the war, and hid themselves in a plain covered with tall lalang grass. The Rajah Mawas beat the Rajah Siamang and the latter with his people ran away and hid in the same plain as our ancestors. The Rajah Mawas came and set fire to the grass and the Rajah Siamang with his people ran away and crossed the Perak river. Our ancestors did not run away, having hid themselves in porcupine burrows in order

* The Mawas is *Hylobates* sp. † The Siamang is *Symphalangus* sp.

to escape from the fire. In spite of this the fire reached them and signed their hair, and this the reason we, their descendants, have curly hair to the present day. After the war was over the King of the Brok* monkeys, Rajah Brok, became judge between the Siamang and the Mawas, and he gave judgment that the Siamang should stop on the south bank of the Perak River and the Mawas on the north bank, and thus they do till the present day, though before they had both lived on the north bank.

"The ancestors of the Malays, when the war arose, ran away down stream carrying a rice spoon with them; and that is the reason why the Malays use a rice spoon in cooking their rice. Our ancestors ran away up stream carrying a pointed stick; and that is the reason why we still use a stick for digging tubers in the jungle."

The other information obtained was fragmentary and consisted of certain beliefs concerning the rainbow, thunder, lightning, the eclipse of the moon, and certain pantangs or tabus attaching to mother-in-law and father-in-law. These are given below.

THE RAINBOW.

"The rainbow is a fishing line. Somewhere far away there lives a king of the Dragons (Rajah Naga) who, when he requires fish, sends a servant to the river to fish for him. As the Rajah's servant lifts his rod from the water you see his line with its two coloured thread appearing in the sky as the rainbow."

The Negritos will not walk into the foot of a rainbow as they believe that to do so would cause them to fall sick.

THUNDER.

"Thunder is caused by the spirits who lived under the earth. When they are preparing their food and cooking it, the noise they make is heard on the earth above. This noise is what we call thunder."

LIGHTNING.

"Lightning is caused by the children of the spirits who live under the earth. When they play at tops they flourish the cords which they use for spinning them, and these appear above the earth as lightning."

THE SUN, THE MOON AND THE STARS.

"The stars are the children of the moon. The sun watches by day and the moon by night. If there is no moon the stars replace her; if there is a moon the stars are quenched."

THE ECLIPSE OF THE MOON.

"Eclipses of the moon are caused by a butterfly settling on the moon and spreading its wings over it while it attempts to eat it."

The Semang name for an eclipse is *haiup hilud* (*haiup* a butterfly and *hilud* to swallow.)

* The Brok is *Macaca* sp.

PANTANGS OR TABUS

Of the two pantangs obtained one related to the dislike of having anything to do with a mother-in-law or father-in-law, and the other to imparting the secrets of magic. Tabus enjoining avoidance of the mother-in-law are in force in many regions of the globe; to give two examples, they are very rigidly applied by the Zulu-Kaffirs of South Africa and by the Dusuns of British North Borneo. The tabus concerning instruction in magical rites have probably been adopted by the aborigines from the local Malays, who have the same custom.

* TABUS RELATING TO THE MOTHER-IN-LAW
AND FATHER-IN-LAW.

A man may not speak to his mother-in-law nor a woman to her father-in-law and they must both avoid these relations as far as possible. If communication is necessary, an intermediary must be employed. The man may, however, speak to his father-in-law and the woman to her mother-in-law, but they must do so very respectfully.

A man may not mention the name of his mother-in-law nor a woman that of her father-in-law.

TABU CONCERNING IMPARTING THE SECRETS OF MAGIC.

Secrets of magic may not be imparted to a pupil except on Tuesday and the night preceding it. This belief, as has been stated above, has probably been adopted from the local Malays. Our Monday night, according to Malay methods of computing, becomes the night of Tuesday (*malam Selasa*) and our Tuesday night the night of Wednesday, etc.

PANTANG LANGUAGE.

It is tabu to use the ordinary names of certain wild animals when in the jungle, the idea being that a name is closely connected with the object to which it is given. Thus to mention the name of dangerous animal is, according to aboriginal ideas, almost equivalent to making it appear. A few examples of tabu words are given below in both the Ijok and Lenggong dialects.

English.	Ordinary word (Lenggong.)	Tabu word (Lenggong)	Ordinary word (Ijok.)	Tabu word (Ijok.)
Tiger	baling	kemun	teiok	kamoit (evil beast ?)
Elephant	gajah	Intok chekeh (said to mean big animal)	gajah	adon

* Possibly adopted from the Malays. An Ijok Malay will not mention the name of his mother.

The writer is rather doubtful about the Ijok ordinary and tabu words for elephant. With regard to the "baling" and "kemun," they are both given by Skeat* as words for tiger used by various Negrito tribes. The Lenggong Semang from whom the writer got his information gave "baling" as the word ordinarily in use and "kemun" as its tabu equivalent: it will be noticed, however, that in sentences given below (page 186) the word used for tiger is the "kemun."

LOVE CHARMS.

A specimen of the so-called Chenduai flower (*Salomonis aphylla*) was bought from a Semang. The Chenduai is in great repute among the Malays as a love charm.

A CUSTOM RELATING TO DEATHS.

An encampment must always be deserted after the death of a member of the tribe.

FACE PAINTING AND NOSE PIERCING.

One young woman had stained her forehead with a broad horizontal band of red pigment. At the corners of her mouth were two smears of lime, which looked at a distance like tusks protruding from the top jaw.

Many of the men and women, especially those of some age, had the septum of the nose pierced to contain a nose-stick, though none of these were seen in use. The Semang showed the writer a specimen, made from a procupine quill.

PATTERNS ON DART QUIVERS AND COMBS.

General information concerning the patterns employed to decorate combs and quivers was very little different from that obtained at Lenggong. Certain facts, however, came out in the course of conversation with the aborigines, which seem to throw some light on the assertions made by Vaughan Stevens with regard to the meaning and use of Semang comb-patterns. He tells us that the largest and central panel of the Semang comb is called *tin-weg* and says that the pattern of this panel represents the disease against which it is supposed to protect its wearer (*vide* Skeat and Blagden's *Pagan Races*, p. 433). In the course of putting some questions to the Ijok people regarding the names of the patterns used on their quivers the writer was told that one of their designs was called *tenwug*. When questioned as to the meaning of the word, they replied that it meant anything crossed, and pointed as an example to the trellis work railings of the rest-house steps on which they were sitting. In order to make certain that they were understood, they further volunteered the information that two cords of bead worn diagonally

* Skeat's *Pagan Races*, Vol. II, Comparative Vocabulary.

crossed over the chest are known as *tenwug manik*. The *tenwug* pattern is frequently found on the central panels of bamboo combs and it seems not at all unlikely that Vaughan Stevens, while intending to obtain the name of the central panel of the combs was merely told the name of the pattern which decorated the panel of the particular comb which he was studying at the time. Skeat's quotations from Vaughan Stevens' works do not, however, make it sufficiently clear whether these observations were made among the western or the eastern Semang (Pangan), and Skeat's quotations are the only medium by which the writer can at present obtain access to Vaughan Stevens' works. *

At least one man denied that the dart-quiver patterns had any magical meaning, but another told the writer that the pattern helped them to obtain food in the jungle. With regard to the quivers it is probably true that they are supposed to have sympathetic magic powers since nearly all the designs represent articles of Semang diet, either animal or vegetable. A Lenggong Semang volunteered a statement that this was the case (*vide* Lenggong paper), so it is most probable that the same thing is also true for Ijok. One or two men informed the writer in reply to direct questions that the patterns of the combs had no use as charms, while a single individual on being rather hardly pressed would only say that perhaps the patterns were of use, as the women always wore the combs. It is possible that the patterns had formerly a magical use but that this has now been almost forgotten. Examples of designs taken from quivers are given on plate XVI and also a "tenwug" pattern from a comb. It will be noticed that the designs differ very little, if at all, from those in use at Lenggong, and that the method of producing many of them is typically Negrito, the outer skin of the bamboo being cut away around the patterns to form a dark coloured background, the patterns themselves thus standing out slightly in the original white outer skin of the plant.

AGRICULTURE

At the time of the writer's visit the aborigines had no ground under cultivation, but one man said that he intended to open a small clearing. They were supposed to be at work preparing ataps for re-roofing the Ijok Mosque but as far as could be seen their labours did not seem to progress rapidly. The local Malays spoke very scornfully of the Semangs' agricultural operations saying that they were too lazy to undertake the troublesome business of burning the jungle, and that when occasionally they *did* overcome their natural indolence and had planted a little padi or other crop, they would probably leave the locality just before it became ripe and everything would be eaten by birds and monkeys.

* Most of the combs figured by Skeat after Vaughan Stevens are said to be eastern Negrito, but from where it is not stated.

TRIBAL NAME AND ORGANIZATION.

The aborigines of Ijok call themselves Menik Gul which means People of the Marsh lands. (Gul, a marsh; menik, men. Baloh menik = many people). Information was also obtained at this place that the Lenggong Semang called themselves in their own dialect Sēmāk Blūm, people of the big (water), *i.e.*, the Perak River. (Sēmāk, people; blūm, big. Sēmāk lēbeh = many people.) Ong blum (Semang) = ayer besar (Malay) = flood (English). As at Lenggong each small group or tribe of Semang has an elderly man in charge of it, who seemed to occupy rather the position of the head of a family than that of a chief.

NAMES OF PATTERNS.

(PLATE XVI.)

- (a) Padi seed (Kembok bah)
- (b) Lotong monkey's teeth (Lemoin boi)
- (c) Tenwug
- (d) Flying-fox elbows (Kenyong kaweid)
- (e) Gourd seeds (Met labu)
- (f) Eyes of the lotong monkey (Met basoh)
- (g) Eyes of the Kuwangkeit bird (Mat langkweitn)

This bird is known as the 'gembala rimau' or tiger's herdsman, and is said always to accompany a tiger.

- (h) Bracelets (Gēlang, name obtained in Malay only)
- (i) *Tenwug* of the flower sheaths of the Jack-fruit (Tenwug nangka)
- (j) Cucumber seeds (Biji timon, name obtained in Malay only)
- (k) Tortoise breast pattern
- (l) Snakes (Ular, name obtained in Malay only.)

LANGUAGE.

Since several vocabularies of the language spoken by the Semang of Ijok have already been taken, the writer thought it well, instead of simply checking off or observer's lists, and possibly adding a few new words, to make some slight attempt to break new ground. With this purpose in view a number of short sentences in the dialects both of Lenggong and Ijok were obtained in order to illustrate to some extent the grammatical constructions employed. This will be found below with their equivalents in both Malay and English, the sentences in the former language, which is necessarily used as the medium for communicating with the aborigines, being given more with the idea of retaining the original form in which the questions were put than of showing any words which may have been borrowed from it by the aborigines or which have a common origin. It will be noted that the Semang of Ijok as well as the aborigines of Lenggong use numeral co-efficients, only instead of speaking of "Oxen

seven tail," as is done by the Malays, they say "Seven body oxen." The possessive pronouns follow the words with which they agree, as they do in good Malay.

English.	Malay.	Langkong Dialect.	Ijak Dialect.
To go up country...	Pergi ulu .	.. Chib dētēh...	.. Chūg nūling
Come here...	.. Mari sini ..	... Chib dēnāh	... Pē bādih ...
To go down stream	Pergi hilir...	... Chib dāyēh	... Chūg nūtok
Don't be frightened	Jangan takut	... Jēk kūtūng	... Yinkot intag
To fell trees	... Tebong kayu	... Gēh nīhūk...	... Tēbong n'hūk
Give (me) water . .	Kasi ayer ...	.. Ōg ong ...	... Āg bētau
Give (me) food (i.e. Kasi makan rice)	rice)	... Ōg nasi ingac	... Āg yēh chī
Heavy rain	... Hujan lebat	... Mī chēkel ...	... Hūjan lēbēt
Many fish ...	... Ikan banyak	.. Lēbēh kāk ...	... Ikan bāloh
(I) don't want to go fishing	Ta ma hu pergi panching	Injek kachib kēnāil	Yēh hendak mūchub kēnigbi
Don't be angry	.. Jaugan marah	... Jēk kachik	.. Yīn-kāt gāhāt
This fish is nice	... Ikan ini sedap	.. Kak noh sēlēp	.. Ikan n'sēdēp
(I) am frightened of tigers	(Sahya) takut hari-mau	Intugū kāmūn (possibly language)	.. Intugū teiok
Very beautiful	.. Chantek sangat	.. Bēt lēloie	... Berat amēd
This ox is better than that	Lembu ini lebeh baik daripada itu	Lēmū nāh bēt lēloie yēh inin	Bēhōd lēmū ātēh ūgh ūgh
Two (head of) oxen	Dua ekor lembu (lit, two tail oxen)	Nī kēnēk mōr lēmū ("mōr" means body)	Bieh kēbōh lēmū ("kebōh" means body)
(That) ox is very fat	Lembu (itu) ban-yak gēmok	Lēmū ahudn lēloie	Lembu mīnchah āmēd
About, approximately	Kira kira	.. Biehūkūb	.. Yēh mēchāyēhaw
About, more or less (About a dollar)	Kurang lebeh (kurang lebeh sa' ringgit)	... Easen mēnang	Kūnī bāloh
I hit his head	.. Sahya pukul kepala dia	Iku tēbāw ānēn	kuie Yēh chōng kuie tokti
He hit my foot	.. Dia pukul kaki saya	Anen tobaw yuku iku	(A phrase was given, but it means, "I hit his foot," "Yeh chong chan tekti")

NAMES OF A FEW ARTICLES OF FOOD.

Tapioca	.. Ubi kayu ...	... Hūbi	.. Piang
Yam (an aroid)	.. Keladi	... Gāku	.. Tālis
Keledak	... .. Koledak	... Silāk	.. Silāk
(A tuber of a convolvulus, <i>Convolvulus batatas</i> (?))			
The Rambutan fruit	Buah rambutan	... Boh tangoie	... Boh tangoie
(Nephelium lappaceum)			
The Durian fruit	... Buah durian	... Boh pēnūg...	... Boh pēnūg

ADDITIONAL NOTES ON THE SEMANG PAYA OF IJOK, SELAMA, PERAK.

BY HERBERT C. ROBINSON AND C. BODEN KLOSS.

(PLATES XVII-XXV).

THE following notes taken by us on a visit to Ijok in March, 1909, refer to the same tribe, and indeed to practically the same individuals as those visited by Mr. Evans, forming the subject of the previous paper. Inasmuch as they are accompanied by a number of photographs and measurements and a fairly full vocabulary* we have thought it worth while to publish them, though a certain amount of material, dealing with primitive beliefs and psychology has unfortunately been mislaid.

I. RANGE OF TRIBE.

The Negrito people forming the subject of the present notes are at the present day confined to a district stretching from Selama and the Krian river on the north to Batu Kurau on the south; eastward they are limited by the crest of the Larut range of mountains, which terminates in Gunung Bintang, a mountain over 6,000 feet in height, while westward they probably never cross the railway running into Province Wellesley or venture into Kedah.

In former days, as we were informed by their present headman, their range extended to Kuala Kurau and Kuala Larut on the sea coast and even so far south as Bruas but the destruction of jungle due to the advance of cultivation and the spread of population, Malay and foreign, now confines them to their present narrow limits.

To the north-west they are in contact with the Negritos of Kedah, centring in Sidin and Baling, the former of whom occasionally cross the Perak boundary at Ulu Selama while eastwards they are in more intimate relations with the closely allied tribe inhabiting, according to one of its members, the eastern slopes of the Larut range, down to the Perak river, from Kuala Kenering, south to Kota Tampin and Kuala Plus. With these latter they intermarry.

It seems evident that the Semang Paya are a tribe rapidly approaching extinction, and that the day is not far distant, when there will no longer be left any representatives of the primitive jungle dwellers, who formerly inhabited the extensive tract of country between the Perak river and the sea. It should be noted, however, that this is the first time that Negritos have been recorded south of Taiping and that the evidence, such as it is, is solely traditional.

To appear in a subsequent number of the *Museums Journal*.

CONDITIONS.

Though maintaining a nominal independence we found the Semang of Ijok living in close contact with the Malays of the village, who formerly, by employing them to cultivate hill padi escaped the payment of rent to Government, aborigines being exempt from this form of taxation. Now, however, ladang cultivation is discouraged and the Semang is no longer an agriculturalist.

At the time of our visit their headquarters were situated in garden land belonging to a Malay who was not improbably their "gembala" or "herdsman" a term, commonly applied, in Semang districts, to Malays who possess influence, hereditary or acquired over these primitive folk, which influence it is needless to remark, is not altogether unprofitable to the possessor. Men and women entered the village at will and purchased at the Chinese shops, where we were credibly informed that a proportion of them had acquired or been persuaded to acquire a taste for opium. They certainly showed an appreciation of money though whether they were able to obtain full value for it is problematical.

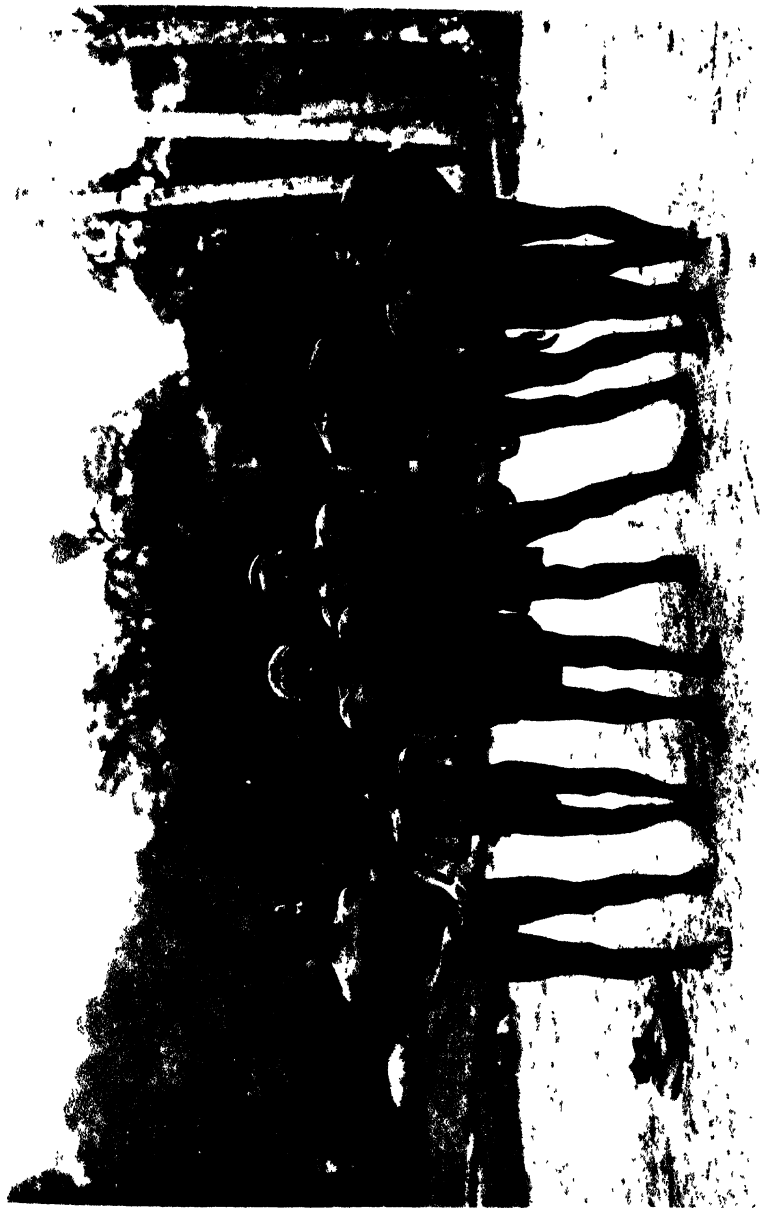
We saw in all eleven people, five adult males, of whom one was elderly, three women, one of whom was aged and three children, but we are certain that a few others did not show themselves. The Tunku Mentri of Larut, who has held the office of Malay Magistrate of the district for some years, assured us that he was certain that the total population of Semangs in the Selama sub-district was less than fifty. *

HABITATIONS.

(PLATES XVIII AND XIX).

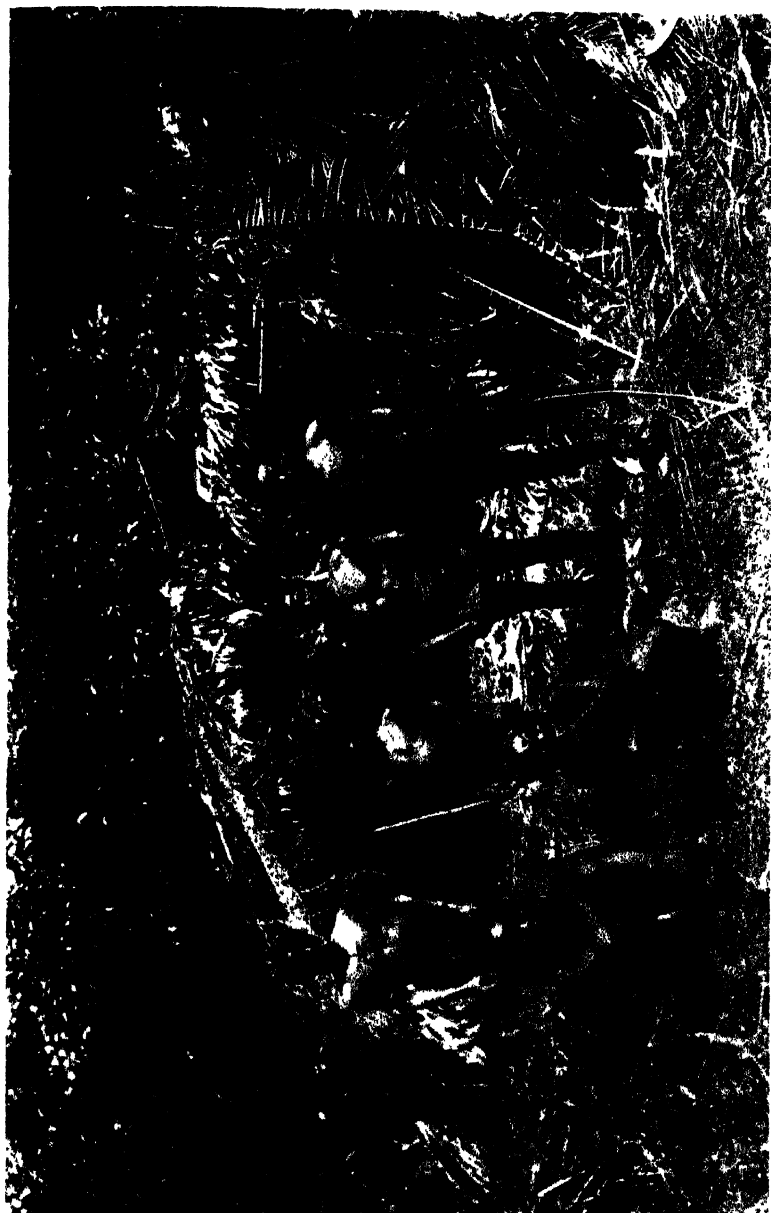
The village consisted of about seven "houses"; each house was merely a curved wind-break and roof combined made up of a light frame work of bamboos and sticks, supporting a thatch made of the fronds of the bertam palm (*Eugeissona tristis*), sheltering a floor space of some six feet by four on which was a rude platform very slightly raised made of the mid-ribs of the same palm. In two or three instances these latter were merely laid on the ground. The huts were in no sequence or order and faced in no particular direction. There was no regular fire-place and cooking operations were conducted anywhere over a fire made of a few branches or smouldering logs. The ground was littered with palm pinnæ, wood shavings and broken bamboo, the debris of matwork and basketry in process of manufacture.

* As regards the numbers of this tribe the third decennial census of the Federated Malay States taken on the night of the 10th March, 1911, records 37 persons as inhabiting the Selama districts. Of these, 22 were adult, 10 males and 12 females; and 15 children, 9 males and 6 females.



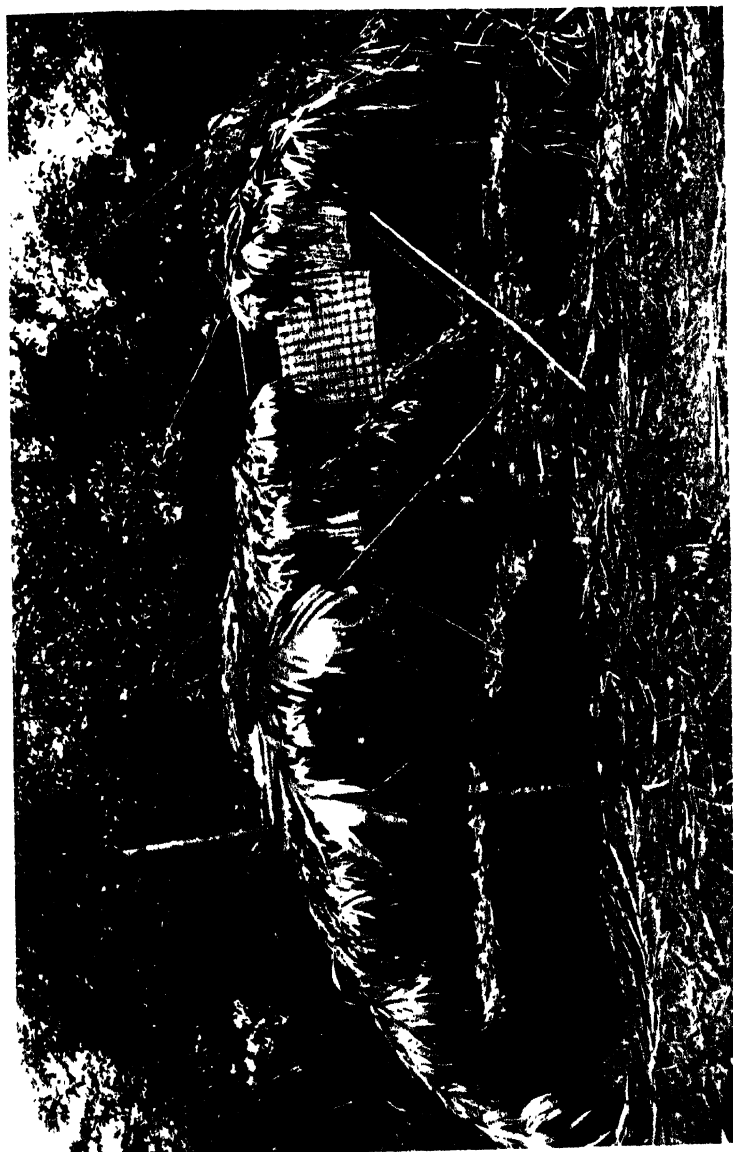
SEMANG OF LOK, SELAWA DISTRICT, PERAK.

C. B. Kloss, Photo.



SEWANG OF LOK, SELAWA DISTRICT, PERAK, SHOWING HOUSES.

C. B. Kew. Photo.



HOUSES OF SEMANG, LOK, SELAMA DISTRICT, PERAK.

(B. K. 1933, Pl. 12)



H. C. Robinson, F.M.S.

SEMANG OF LOK, SELAWA DISTRICT, PERAK.



H. C. Robinson, Photo.

SEMANG OF ILOK, SEMANG DISTRICT, PERAK.



H. C. Robinson Photo

SEWANG OF LIOK, SELAMA DISTRICT, PERAK.



C. D. Kloss, Photo.

SEMANG OF TIOK, SELAWA DISTRICT, PERAK.



B. A. S. P. S. K.

SEWANG OF LOK, SELAWA DISTRICT, PERAK.

These houses were built by the women on account of a superstition that exists to the effect that if any portion of the camp is built by men the party living in it would be eaten by tigers. *

PHYSICAL CHARACTERS.

Dealing with the physical characters of these people the colour of the skin, was found to be intermediate between shades 3-4 of Broca as given in the "Notes and Queries on Anthropology" published by the British Association in 1899, which at the moment was the only scale to hand, though it is well to note that in the Indo-Malayan region this scale is not sufficiently extensive to be of much comparative value. In short the skin, though varying widely between the two tints, neither of which it resembled, might be described as essentially rufous chocolate, without any lustre or oily appearance.

The colour on the whole body was very uniform but in two instances was much bleached by an aggravated form of kurap (*Tinea* sp.), to which these people, owing to their mode of life, are especially liable.

The hair, always a difficult character to describe, was dull black in colour, not coarse in texture, but somewhat wiry. On the whole it grew evenly over the scalp and it was difficult to detect any trace of the peppercorn appearance characteristic of the true Andamanese Negrito. It may be described as woolly or in cases where it had not been recently shaved as fuzzy. The hair of the children was worn longer than that of the adults and resembled the wool on the back of a sheep.

In some cases it was evidently shaved periodically over the whole of the scalp (pl. xvii, third figure from left; pl. xx, right hand figure) which in others (pl. xvii, fourth figure from left; pl. xx, left hand figure) a narrow brow fillet about two inches wide extended from ear to ear. The two women we saw, one of whom was nearly nubile but unmarried, had a lock of hair an inch or two longer than the rest on the back of the crown.

The headman wore a slightly frizzly beard and one or two others had indications of a moustache. Body hair including the axillary and public regions and the lower limbs was scanty, the rest of the body was practically glabrous.

The eyes were the rich dark brown that is conventionally described as black, the sclerotic was slightly stained yellow, the plane of the eyelids was horizontal; in only two instances was there the slightest trace of an epicanthus: the eyelashes were particularly long and fine.

* With further regard to the sexes we found that this party also maintained a custom which forbade father-in-law and daughter-in-law to communicate directly with each other.

The nose was especially broad, concave and flattened, the nostrils being visible from above, except in one or two instances in which the tip was depressed and flattened forming a hook.

The lips were not particularly thick nor were they much everted. Prognathism was only slightly indicated. The cheek bones were only moderately prominent and the contour of the face was shield-shaped; superciliary and other ridges were not in evidence and the whole cranium appeared like that of the majority of these tribes to be of infantile type. The chin was somewhat pointed and the jaw though small was powerfully formed at the angles, the muscles being well developed. Teeth were white and regular. The ears were small, flat and without lobes. The forehead was narrow and rounded and the skull ill-filled.

The general expression was not vivacious, appearing to us hardly that of a people dependent on their alertness for the means of subsistence.

The hands were small, the fingers delicate and tapering, the feet were turned out when walking but the great toe was quite in line with the inner side of the foot, being in no way deflected.

DESS AND ADORNMENT.

The dress of the males was a cotton or bark-cloth T-bandage, the end being brought up beneath a rattan girdle and dependent in front; that of the women consisted of two skirts, one being composed of one foot lengths of the rhizomorph of a fungus (*akar batu*) knotted by a clove hitch to a double length of cord of doubtful origin forming a fringe about three feet long which was tound round the waist. The second skirt was of similar form but of greater depth and less exiguous being made of shredded grass and vegetable fibre, bunched over the hips. Both sexes wore bracelets and necklet of the same *akar batu* as that composing the women's skirts, plaited rattan bracerlots and, for state occasions, ornaments of beads of various colours strung with the teeth of monkcys and worn either as fillets or necklets. The men also wore pandan leaf fillets ornamented with scarlet flowers with a long projecting plume at the back of the same material. The ears were not perforated and no ear-rings were seen but the septum of the nose was pierced for the reception of a porcupine quill or other similar ornament. Large bunches of white flowers were worn by the women on one occasion at the back of the head. Ornamented bamboo combs were also in use by the women but were not abundant and were parted with reluctantly.

WEAPONS.

We have little to add to Mr. Evans' description of the weapons but it may be mentioned that bamboo spears, with the points hardened by the fire are in use for hunting, while the bow and arrow though not actually used at the present day by the Ijok Semang are not unknown to them.



H. C. Robinson, Photo

IPOH POISON TREE (*Antiaris toxicaria*) SHOWING TAPPING CUTS.

The only poison in use is *ipoh* (*antiaris toxicaria*). *Brual*, which derives its potency from an alkaloid allied to or or identical with strychnine, being apparently unknown to them.

The photograph of an exceptionally large *ipoh* tree in the jungle near Ijok, which must have been in use for several generations is reproduced on plate xxv.

During our stay we were able to verify the fact that *ipoh* is not effective against domestic poultry. A considerable quantity was applied to a wound on the thigh of an old rooster and though the bird looked uncomfortable for two or three hours it recovered completely and was later eaten without ill effects by our Malay boys.

The local Semang, as do other aborigines of the Peninsula, assert that *ipoh* is without effect on ground game and poultry whereas *brual* has a toxic effect on everything wounded by an arrow charged with it. *Ipoh* loses its effect very quickly when kept long and especially when exposed to damp but the poison used on this occasion was quite freshly prepared.

MEASUREMENT OF "SEMANG" TAKEN AT IJOK, SELAMA, PERAK.

Number ...	1	2	3	4	5	6
Age ...	± 30	± 25	± 40	± 25	± 20	± 30
Character of hair ...	very woolly	shaved	grey curly	very woolly	woolly	shaved
Epicanthus ...	absent	absent	absent	absent	slight	slight

MEASUREMENTS IN MILLIMETRES.						
Stature ...	1474	1582	1490	1547	1618	1640
Length of head...	178	174	186	183	176	190
Breadth of head ...	138	140	141	141	138	148
Length of face ...	101	119	107	101	117	117
Breadth of face...	134	137	143	129	130	139
Circumference of chest...	857	873	795	780	797	815
Length of nose ...	38	41	42	36	44	45
Breadth of nose ...	45.5	39	46	39	42	47.5

INDICES.						
Cephalic index ...	77.5	80.5	75.8	77.1	78.4	77.9
Facial index ...	75.8	86.9	74.8	78.5	90.0	84.2
Nasal index ...	120	95.1	109.5	101.3	95.5	105.5

Nos. 1, 2 and 3 are pure bred, Ijok Semang. No. 4 was a half bred between a Lenggong man and an Ijok mother. Nos. 5 and 6 were Lenggong "Sakai."

NOTES ON SOME ABORIGINAL TRIBES OF PAHANG.

BY IVOR H. N. EVANS, B.A., ASSISTANT CURATOR AND ETHNOGRAPHICAL
ASSISTANT, F.M.S. MUSEUMS.

(PLATES XXVI-XXXVIII).

THE following short papers are the results of a month's work in Pahang carried out in September and October, 1913. Three parties of Jakun-like people* were met with as well as two small divisions of Pangan (eastern Negritos). Kuala Tembeling was the point from which various expeditions were made, short visits being paid to the Cheka river, the Tekai river and the mouth of the Retang.

The Jelai or Pahang, the largest river in the country, is known by the former name above Kuala Tembeling, where a small stream called the Pahang joins it, and by the latter below this point, though actually the Jelai and the Pahang are one, the stream which gives the river its name in its lower reaches being merely a small tributary.† The Cheka joins the main stream on its right bank not far above Kuala Tembeling, and the Retang just below Kuala Tembeling on its left bank. The Tekai is a tributary of the Tembeling. The Tembeling enters the Jelai at Kuala Tembeling as the name shows (Kuala, river mouth).

The two divisions of Pangans were living on the Cheka, one about its head-waters and the other not far from its mouth. Of the Jakun, sections of two tribes had settled close together on the Tekai, and a portion of another near the mouth of the Retang. There has evidently been a great re-shuffling of tribes in this part of Pahang, and attention is drawn to the recent wanderings of the Tekai and Retang aborigines in the sections dealing with these peoples. In the small district of Pahang under review we have the Jakun tribes of the Tembeling living some miles to the north of the Cheka Pangan, whereas properly the Pangan country, comprising very roughly the eastern Siamese States of the Peninsula, Trengganu, Kelantan and N.E. Pahang, lies north of that inhabited by Sakai and Jakun tribes, except along the line of the main mountain range of the Peninsula to the west, which forms a rough boundary between Jakun, Sakai, and Semang and the eastern Negritos (Pangan). In the district with which these papers deal Sakai and Pangan and Jakun meet and overlap, if not fuse.

* These Jakun-like people, have probably a small admixture of Sakai blood, and speak Sakai dialects. In this paper, for the sake of convenience, they are elsewhere referred to as Jakun.

† For further reference to this Malay method of naming rivers see "Kelantan, a State of the Malay Peninsula" by W. A. Graham (Page 8).



I H N. Esau's Photo.

PANGAN OF KUALA CHEKA, NEAR KUALA TEMBELING, PAHANG.



I H N E n s. Photo.

PANGAN OF KUALA CHEKA, NEAR KUALA TEMBELING, PAHANG.



J. H. N. I. 1900, Pl. 200

PANGAN OF KUALA CHEKA, NAR KUALA TEMBELING, PAIANG.



L. H. S. Lyons, Photo

PANGAN OF KUALA CHEKA NEAR KUALA TEMBEING, PAHANG.



J. H. A. Evans, Photo

PANGAN OF KUALA CHEKA, NEAR KUALA TEMBLING, PAHANG.

THE PANGAN OF THE CHEKA RIVER, PAHANG.

(PLATES XXVI-XXX, XXXVII AND XXXVIII).

The two divisions of the Pangan met with on the Cheka are settled as compared with those of many of the rivers of Pahang, which are said rarely to come in contact even with the Malays. Each group is under the control of a Malay, whom they look upon as their master and protector. The Malay on his side no doubt makes a very good thing out of the pact, sending the Pangan off into the jungle to collect large quantities of rattans and other produce for him, and supplying them in return with rice, tobacco, and occasionally with a little cloth. The Malay who controls the Pangan in the Ulu (head-waters of the) Cheka is a Sumatran named Man, who has married a local Malay woman, it being through his wife that he has obtained his power over the people. The Pangan of the Kuala (mouth of the) Cheka are also "owned" by a Sumatran Malay, a Kanipar man, named Pakeh, who is a son-in-law of the local Penghulu or village headman. The writer was unfortunately only able to meet these groups of Pangan for a short time, altogether parts of four days, as in both cases their Malay master was impatient for them to go in search of jungle produce, and only kept them back for a couple of days by special request.

TRIBAL NAME AND ORGANIZATION.

The tribal name of the Cheka Pangan, and that by which they like to be called, appears to be Battek, which in their own language simply means "men." In dealing with people in a low state of civilization there is generally a difficulty in getting them to grasp abstract ideas, and it is always quite possible that no true tribal name may exist apart from that given by a race in a more advanced state. Many of the aboriginal tribes of the Peninsula, as the Cheka people, simply call themselves "men" (Senoi, Menik Semak, etc.), or, if they can give more details, describe themselves as, "men of the marshes," (menik gul), men of the river reaches, (menik rantau), men of the big river (semak blum), etc. After all from what are many of our European national names derived if not from some such simple beginnings, *e.g.* Saxons, men who wear the Seaxe, Cymri said to mean comrades, French (Frank) probably meaning free? The Cheka people repudiated absolutely the name of Pangan, which they gave the writer to understand denoted a low, black, jungle-living, root-eating kind of a person quite different from themselves. Pangan in the sense of being eastern Negritos they however undoubtedly were, but they had progressed in so far that they had to a certain extent abandoned their wandering life and had taken slightly to agriculture. Pangan too was the usual term used by the local Malays* in speaking of the Cheka aborigines among

* The Pangan name for the Malays is Gup.

themselves, but when addressing an aboriginal they substituted *Battek* for the former term. As has been remarked in another paper, all the jungle tribes dislike having such terms as *Sakai*, *Semang*, etc., applied to them, which they know the Malays use in a slighting sense, but are pleased if called by some other name to which no stigma is attached.

The name applied by the Malays to each small division of *Pangan* is "puwak"; according to Wilkinson meaning a troop, an assembly, or the family in the widest sense. The Malays in using the term will speak of "*Pachet's puwak*," or say that there is a "puwak" of *Pangan* living on such and such a river. Probably the word is used in the family sense as each party seems to be little more than a family of which one or two of the elder men are in charge. There appears, however, to be some slight bond between different "puwaks" related by blood or language, which unites them into a very loosely knit tribe. The *Cheka Pangan* call their elders by certain names which they have probably partly got from the Malays, who often give aboriginals high sounding titles in fun, these being generally used by the recipient in all seriousness. If not obtained from the Malays the titles have been adopted from some *Sakai* or *Jakun* tribe, most likely the latter (*Batin*, *see* below, being a *Jakun* title) with whom they have been in contact at some fairly recent date. The full list of *Pangan* dignitaries, according to the *Kuala Cheka* people, runs in order as follows *Batin*, *Rajah*, *Pengghulu*, *Pemaungku*. The *Rajah*-ship is at present in abeyance, the former occupant of the office, who lived in the *Ulu Cheka*, having died recently. The *Batin* and the *Pemaungku* are with the *Kuala Cheka* division of the tribe. The writer was told that there was another "puwak" of *Pangan*, who were apparently part of the same loosely organized tribe, living on the *Krau* river with the local *Sakai*. Titles are said to descend in the male line, *i.e.*, to the eldest son of the deceased officer.

HABITATIONS.

As has been already remarked, the *Pangan* of the *Cheka* river have made some little advance in civilization owing to having partly given up their roving habits. The only settlement visited was that of the *Ulu Cheka* group. This was reached after about half an hour's walk from the Malay village of *Kampong Ulu Cheka*, and consisted of three huts standing in quite an extensive clearing. The most interesting feature about these was that they were not raised from the ground. The houses of the Malay, the *Jakun* and the *Sakai* are almost invariably pile dwellings of the usual type found throughout the Indo-Chinese and Indonesian regions.

Even *Sakai* and *Jakun* huts occupied perhaps only for a couple of months are generally of this type. The Negrito inhabitants of the Peninsula, who are typically a nomad people, build either beehive huts of palm leaves or small wind shelters of the same materials, the

only other type of artificial* dwelling recorded being tree-shelters. The Pangan of the Ulu Cheka have, therefore, even when they have advanced far enough to build a dwelling which may be dignified by the name of a house, clung to the old Negrito plan of building on the ground and have not adopted the pile-dwelling type of house of their Malay and Sakai neighbours. Each house consisted of a single room and, apart from the fact that there was no kitchen (dapor) or inner room and that it was built on the ground, the Pangan dwelling in its shape, method of construction, and materials was not unlike that of the poorer class of Pahang Malay. The walls were made of sheets of bark of the *kepong* tree stretched over the framework of the house while the roof was thatched with leaves of the *chuckoh* palm. In one hut visited, which will serve as an example of the others, there was a space of bare earth reaching from the door to the wall at the back, and occupying about one-third of the floor space: in the middle of this a fire was burning, which was made of small logs placed radially. The rest of the earth floor was covered in by a sleeping platform of split bamboo raised about six inches from the ground on a rude framework of saplings or small branches. On the platform were lying a few pandanus mats, not unskilfully made, but without any ornamentation. Several broken pieces of blow-pipes and one whole specimen were stored under the platform. Various household utensils such as water-gourds, and cooking pots, the latter bought from Malay or Chinese traders, were ranged along the wall at the back of the hut and in one corner were a couple of large meshed carrying baskets of *bembau*. At the time of the writer's visit there were only four men and a woman with a baby in the settlement, the other inhabitants, women and children, having gone off into the jungle to dig for roots.

No opportunity of visiting the settlement near Kuala Cheka presented itself, but they said that they also had a clearing and from their description their houses seemed to be of the same type as those of the Ulu Cheka people.

DRESS AND ADORNMENT.

The Pangan men all wore T-bandage loin-cloths of native bark cloth or of European cotton stuff, supported by a string of vegetable fibre or split rattan tied round the waist. Above this a long cord, made either of the plaited rhizomorphs of a fungus called *akar batu* or of the plaited fibres of a palm, was wound several times tightly round the body with its ends tied together. This cord was often used for holding a sheathless parang or working knife, which thus hung with its naked blade against the thigh and buttocks. Necklaces and bracelets of several single strands of *akar batu* were common, the former being tied in front so as to leave an end depending. Other than these the men were wearing no ornaments. The women

* Rock shelters are often made use of.

usually made some attempt at decorating themselves; their dress consisted of a very scanty T-bandage loin-cloth of *tërap* (*artocarpus kunstleri*) or *ipoh* (*antiaris toxicaria*) bark held in position by a string of vegetable fibre wound many times around the waist; above this one or two of them wore an ornament made from a single strip of rattan cane coiled several times round the body, the two ends of the coil being tied together. These strips of rattan were decorated with neatly scratched-in patterns ornamented with burnt-in dots (plate xxxvii). Bamboo combs were rare, but two examples were obtained, one a large and rather new specimen (length 12.5 cms. breadth 6.5 cms.) decorated with some very roughly scratched-in patterns which were said to represent jungle flowers; the other older and smaller (length 8.5 cms., breadth 4.5 cms.), the patterns on it being chiefly of the type known to Malays as "puchok rebong"—bamboo sprouts. Stads of rolled up *palas* leaves were noticed in the ears of an unmarried girl and a married woman was seen wearing a bamboo comb and several flowers of the *sendudok* (*Melastoma polyanthum*) in her hair.

With regard to hair dressing the different types can be well seen in the accompanying illustrations. The men often shave the head entirely, partly in order to rid themselves of parasites, partly owing to the trouble of dressing their densely matted hair, and probably also in order that the Malays shall not be able to tease them about having woolly heads. With their fondness for shaving or cutting the hair very short it is difficult to obtain any idea as to what length the hair would grow if not interfered with. The married woman in the centre of plate xxix (upper figure) is not typical and it would therefore be unfair to theorize upon the length of her hair. The other two unmarried girls in the same picture have their hair cut fairly short. The married woman seen in the Ulu Cheka had hair reaching only to the base of the neck. Probably typical Negrito hair if left uncut would only grow long enough to form a large woolly mop.

WEAPONS.

Apart from two old Tower muskets seen in the house of one of the Ulu Cheka Pangan, the only weapons in use appeared to be blow-pipes and even these were comparatively rare, each man, as a rule, only possessing a single specimen. The reason for this was, the Pangan said, that bamboos with a length between the joints sufficient for making blow-pipes were very difficult to get locally. The most prized weapons they owned were those obtained from other aboriginal tribes, especially from the aborigines who live in the hilly country at the source of the river Jelai, probably a Sakai tribe, who, living in a mountainous district, are able to obtain long-jointed bamboos. The Pangan thus value their blow-pipes very highly, one man saying that

his had belonged to his father before him, and it was an heirloom. A few locally made blow-pipes were however seen: these were much clumsier than those made by the hill people. In general design they resembled the usual type found in Selangor, Negri Sembilan and N. E. Pahang, having a conical wooden mouth-piece and a lashing of rattan binding around the distal end of the outer tube. The bamboo of this tube was split longitudinally all round into a number of thin strips by cutting out long wedge-shaped pieces, the broader ends of the wedges lying towards the muzzle. The strips of bamboo into which the muzzle of the outer tube was thus divided were drawn together again into cylindrical form, this necessarily leaving the muzzle with a diameter considerably less than that of the rest of the tube. To keep the strips together they were lapped round with the rattan binding mentioned above, which is covered over with some kind of gum or resin, that most generally used being "gettah malau" or "ambalau."

The purpose of treating the end of the outer bamboo in this manner is to give it a good grip on the inner tube. Pangan statements as to the difficulty of obtaining suitable bamboos for making blow-pipes were supported by two peculiarities in the outer or covering tube of most of the locally made specimens, one being that the weapons were rather clumsy since the bamboos used for the outer tubes were considerably larger than those generally employed by the jungle tribes of Selangor or Negri Sembilan; the other that each outer tube was made in two sections, and consisted of a long proximal joint, a whole internode, into which a shorter piece was fitted to form the distal or muzzle section. These two pieces were joined by shaving down one end of the bamboo which was to form the muzzle section for a length of about seven cms. and then pushing this portion into the distal section, the joint being strengthened by a binding of rattan around the end of the enclosing bamboo. Other aboriginal tribes generally use either a single long internode to form the outer tube or else cut two internodes with their connecting node, and poke out the septum to allow the passage of the inner tube: the remaining thickened ring from which the septum arose helping to keep the inner tube in position. There are, however, several specimens of blow-pipes in the Perak Museum in which the outer tube is composed of two pieces, these mostly being from the Slim district of Batang Padang, and it is noticeable that in all these the proximal section is made from a rather large bamboo and the distal from one which is a good deal smaller. These remarks also hold good for the Pangan blow-pipes, and it seems likely that the reason for making the outer tube in two pieces is that certain tribes have adopted rather a different method of insuring the rigidity of the inner tube, this probably again being owing to the local distribution of different species of bamboo. For this purpose the Upper Perak people rely

on a tightly fitting outer tube made from a single internode; the tribes who use outer tubes composed of two internodes and their intervening node on the support afforded by the narrow muzzle, the remains of the node on the inside of the outer tube, the covering section of the inner tube joint, which touches the inner wall of the outer tube, and the attachment of the mouth-piece which is affixed to the inner tube end and fits closely into the outer; whereas the users of two-piece outer tubes have the inner tube supported at the junction of the mouth-piece, and along the whole length of the small distal section of the outer tube. With regard to the inner tube of the Cheka type of blow-pipe it has no peculiarities calling for notice beyond the fact that its proximal section is rather short which brings the covering section of the bamboo over the joint well down within the larger portion of the outer tube, without touching it.

The Pangan dart-quiver of the Cheka river is of rather an intermediate type. The only specimen obtained, which was purchased from the Ulu Cheka people, is a good example. It is a plain bamboo receptacle 39 cms. high with a cover of soft plaited pandanus, the top of which is slightly convex and rises near its edge into four very slightly marked points. This is rather reminiscent of the type of cover found on many of the quivers belonging to what Skeat calls the Kuantan type of blow-pipe, (*see* blow-pipe and quiver described below on p. 210). The Cheka quiver is rather taller than those of the ordinary Selangor type and contains extremely long darts, exceeding in length those from any aboriginal tribe in the Perak Museum collection, their length being on average 33 cms. The standard for measuring blow-pipe darts according to the Ulu Cheka people is from the maker's elbow to the bottom joint of his little finger. The Pangan of Ulu Aring, Kelantan, as Skeat tells us, also use this standard as well as another, the length of the foot. The tops of several dart heads in the quiver are marked with a black cross, which the Pangans said was merely made for ornament. The poisoned darts of which there are only three in the quiver are all unmarked, and of the unpoisoned ones some have the marking, and others not. In a few cases the base of the conical dart-head has also been blackened to a height of about a third of an inch. The poison used on the darts was said to be made from *ipoh* (*antiaris toxicaria*), *ipoh akar* (*strychnos* sp. ?), *bangkong tikus* (?) and other vegetable substances.

MUSICAL INSTRUMENTS.

Only a single musical instrument was obtained from the Pangan, this being a simple two stringed zither of the kind known to the Malays as "gendang batak." It consists of two fine strings made from a single length of liana stretched longitudinally on an internode of bamboo. The upper points of attachment of the strings (*i.e.*, the ends of the length of liana) are bound several times round the body

of the instrument and are finished off in two ornamental scroll-knots. At the lower point of attachment where the cord is folded backwards, the strings are kept in position by a small wooden cross-piece, held by a loop knot, the cross piece resting against the edge of the bamboo internode. An excellent illustration of the same type of instrument will be found in Messrs Annandale and Robinson's *Fasciculi Malayenses* (*Anthropology*, Part II, (a), plate xxi, c 24). The only difference between this and the Pangan specimen being the method of fastening the strings at the base of the instrument.

The Pangan told the writer that musical entertainments were only indulged in during the fruit season, and consequently at other times of year they had few musical instruments in their houses, those from the previous season having been broken or thrown away.

OTHER MANUFACTURES.

• Other than the blow-pipes, quivers, bark-cloth, combs and carrying baskets already mentioned the Pangan seemed to have very few articles of their own manufacture. Small pandanus pouches for holding sirih leaf and betel nut were in general use, and two curious tocacco boxes made from the shell of the *terua* or *kulim* (*Sorodocarpus borneensis*) fruit were also seen. These were formed by boring a round hole in the lower end of the shell at either side and polishing the outside, the septum in the interior being complete. An unusual type of wooden mortar, used for pounding up food stuff, was bought in the Ulu Cheka. It was cut from a solid block of wood and its body much resembled that of the mortars used by the Semang of Perak. The peculiarity about it was that its base tapered into a spike seven cms. long. This enabled the utensil to be fixed firmly in the ground when required for use. Small wooden stirrers, such as the Malays call *sudit*, were seen in the Ulu Cheka and were used in cooking rice. A heavy palm-wood * club or mallet, 28 cms. long, used for beating out bark-cloth was purchased in the Ulu Cheka. The head of this was flattened on either side, but one side, that used in making the cloth, was cross-hatched with fairly deep cuts which divided up the surface into small and rather irregular rectangular sections. Gourds for holding water were in general use but presented no special features.

AGRICULTURE AND FOOD SUPPLY.

As noted above, the Pangan have made some little progress in the arts of agriculture. The houses of the Ulu Cheka people were situated in a wide jungle clearing planted with Indian corn. At the time of the writer's visit they were living partly on such food as

* Made from the wood of the *bayas* palm.

they could obtain from their Malay protector in return for jungle produce, and partly on tubers which they dug up in the jungle and roasted in the ashes of their fires. The corn crop was just beginning to ripen so they were only able to pick a few heads from it each day. They probably added to the menu by shooting animals and birds with their blow-pipes. Fish are easy to obtain in the Cheka river, either by means of traps or with rod and line.

PHYSICAL CHARACTERISTICS AND MEASUREMENTS.

With regard to the aborigines of the Ulu Cheka, the four men and one woman seen might all be said to be fairly typical Negritos. The skin colour was dark brown to black and the hair woolly and of the sooty dry-looking colour commonly found among the Perak Semang. Three of the men very much resembled in facial appearance the Pangan of the Ulu Aring, Kelantan, of whom a picture is given in Skeat's *Pagan Races* (Vol. II, p. 777): the fourth man, Pachet the leader of the party, had a rather childish facial expression,* like that to be so often seen in the Semang. Among the Kuala Cheka people it was noticeable that some of the younger members of the party were much less typical than their elders, for instance the young man, the second from the left in plate xxvii has hair which is as straight as that of the average Malay, while that of the other three members of the group is more or less typical. The woman who is the central figure in plate xxix (upper figure) is again not typical, the hair being rather wavy than frizzly and the skin comparatively light: her whole appearance being in fact rather Sakai than Negrito. On the other hand the little girl on the left of the same picture, besides having rather typical hair, had a skin almost as black as that of a West African negress, this character being well shown in plate xxvi where she appears again. The other woman of the three photographed was fairly true to Negrito type, having frizzly hair, a dark brown skin, and a rather infantile type of face. The man shown in plate xxx had the most truly Negrito hair seen among the Cheka Pangan, each curl being tightly wound into a little ball, the hair formation differing only from that of a South African Bushman in the lesser extent of skin visible between each curl. This is best shown in the right hand figure. The writer paid a second visit to Kuala Cheka after leaving the Tekai in order to make sure of getting some fairly clear photographs, as those obtained on the first occasion when he met the Kuala Cheka Pangan had been taken under bad weather conditions: unfortunately, however, this man had shaved his head in the interval. The Batin, who was in charge of the Kuala Cheka Pangan, had a small chin-tuft beard, as had also Songsong an Ulu Cheka man.

* The photographs taken in the Ulu Cheka unfortunately did not turn out well enough to reproduce.

HEAD MEASUREMENTS.

These were all taken from Adult Males.

Locality.	Length of head. mm.	Breadth of head. mm.	Cephalic Index.	Remarks.
(1) Kuala Cheka	186	138	74.1	
(2) "	184	136	73.9	
(3) "	176	137	77.77	
(4) Ulu Cheka	176	137	77.77	Man named Yes
(5) "	184	144	78.2	Man named Pachet
(6) "	171	140	81.8	Man named Songsong
(7) "	181	140	77.9	Man named Wül

The average cephalic index of the seven individuals measured is therefore 77.2, ranging from 73.9-81.8.

It is scarcely fair to base any conclusions on so small a series of measurements, but, in so far as they go, they show considerable variety, two of the Kuala Cheka men being dolichocephals (cephalic indices below 75), one of the Kuala Cheka men and one from the Ulu Cheka, just within the sub-dolichocephalic division (cephalic indices 77.77 to 78.2), two Ulu Cheka men mesaticephals (cephalic indices 77.78 to 80), and one Ulu Cheka man a sub-brachycephal (cephalic indices 80.01 to 81.8). Typically the Pangans should be mesaticephals or sub-brachycephals, and even on the showing of this table the Cheka people are not far below the mesaticephalic line. Probably there is a slight admixture of other blood (Sakai, Malay or Jakun) in the tribe, but this only crops up here and there among them, showing itself in a few individuals in the straight or wavy character of the hair or, if Sakai blood be present, in a tendency to dolichocephaly.

FACE PAINTING AND TATTOOING.*

Tattooing was common among both sections of the Pangans and was found on the faces of both males and females. Face painting, which was done with a black pigment made from "gettah prah," † the sap of a tree, was only noticed on the faces of the Kuala Cheka women, but is no doubt also practised by the Ulu Cheka people. The face paint designs as shown in plate xxxviii, figure 1, are not very clear in the photograph, (plate xxix, upper figure). The tattooing consisted as a rule of large blue-black dots or round marks as large as the tips of the fingers, the most common form of ornamentation, both in men and women, being a line of them running round the face, taking in the chin, the sides of the face in front of the ears, the

* Tattoo marks do not show in any of the photographs.

† The prah tree is said by Wilkinson to be either *Mezzetia leptopoda* or *Elataeriospermum tapos*.

temples, and the forehead just above the eyebrows. A rather more complicated design was seen on the face of Pachet the head-man of the Ulu Cheka Pangan, (plate xxxviii, figure 2). Several individuals had only a few dots on the sides of the face or on the forehead. All the Pangan questioned were unanimous in saying that the art of tattooing was one which had been known for many generations. With regard to its use they said that it was done merely for decoration, but one man further asserted that it was a good remedy for headache. It is rather curious that the Pangan should have taken to tattooing as tattoo marks do not show up at all clearly on their dark skins, it being necessary in one case to inspect a man's face at very close quarters before it was possible to make out how the pattern was arranged. In no instance was tattooing seen on any of the Sakai of the neighbouring rivers, though it would show up extremely well on their much fairer skins.

Dark races do not as a rule tattoo, but instead make patterns on their bodies by cutting designs in the flesh and rubbing in earth or mineral substances, raised scars termed keloids resulting from the operation. The Tamils are, however, a notable exception to this rule.

The Pangan said that the pigment used in tattooing was soot produced by burning damar gum, and one of the Ulu Cheka men also stated that before use it was mixed with a little human milk. The implement at present used in tattooing is the ordinary European-made needle.

EAR BORING, NOSE PIERCING AND TOOTH FILING.

All the women and girls who had reached the age of puberty had both ears pierced. The most common objects used as ear-rings were small pearl or bone shirt-buttons obtained from Malay traders, these being worn against the front of the lobe and secured by a string passing through the hole. Occasionally a native cigarette was carried in the lobe of the ear. Ear studs of rolled "Pallas" leaves have been mentioned in a previous section. In no case was piercing of the nose septum observed, although it was said that the wilder Pangan tribes practised this form of mutilation. Tooth filing was stated not to be obligatory, but several men had the six front teeth in the upper jaw rubbed down.

RELIGION, SUPERSTITIONS AND TABUS, ETC.

With regard to religion and belief in an after life the writer could obtain nothing but negative information, though it would appear that, apart from the bird-soul theory set forth below, the Pangan must have some idea that the spirits of men live on after death, since the Kuala Cheka people stated that food, water, and the dead person's belongings are placed on the grave.

With regard to the bird-soul Vaughan Stevens has put on record a good deal of information obtained by him from the Pangan and judging by what the Pangan of Kuala Cheka told the writer his (V. S.'s) observations would appear to be correct.

THE PANGAN BIRD-SOUL.

The following are the statements about the bird soul obtained from the people of Kuala Cheka.

"The soul of every Pangan is a green bird of the kind called Bian, which has a long beak and feeds on fruit and insects.* The Bian has two cries, one Kah-Kah-Kah, the other Tutoh buah (gorge fruit). When a woman is pregnant and hears one of these birds in the jungle, she knows that the soul of her child has arrived. When a man dies, his soul leaves him in the form of a bird. If anyone catches a Bian bird a great thunder storm will occur."

Apparently a man's soul can leave his body during life in the shape of a Bian bird, for the Pangan said that when they hear one of these birds they know that a friend is coming to see them, and they start calling out the names of people they know until the bird is silent. The last name mentioned before the bird ceases crying is that of the visitor who is coming.

THE ECLIPSE OF THE MOON.

* The Pangan seemed to be altogether without explanations of the majority of natural phenomena, but as is the case with all savage tribes they had an explanation of the eclipse of the moon, a thing which, according to the ideas of a primitive people, lies altogether outside the course of Nature. The lunar eclipse, which they call "jekob hilug," † "snake swallow," is said to be caused, as its name denotes, by some gigantic snake trying to swallow the moon.

TABUS.

The Pangan of the Ulu Cheka informed the writer that it was tabu for a man or woman to mention the name of their father-in-law or mother-in-law and that they must not pass in front of either of them. Both father-in-law and mother-in-law may be addressed, but they must be spoken to with respect.

PERSONAL NAMES.

The Pangan of the Ulu Cheka said that a child, whether male or female, was named from the river or stream nearest the place at which it was born. The four men in the settlement, Pachet, Wul, Songsong, and Yes were all said to have received their names from local streams or small rivers. The Kuala Cheka Pangan confirmed the statements made by the other division, giving two men's names as examples, Geh, and Saboie (or Choie), both of which they said were also the names of rivers.

MARRIAGE.

Marriages among the Cheka Pangan were stated to take place at the durian fruit season, and it was also said that there was no marriage ceremony except a feast; very possibly however the latter information is incorrect. The Ulu Cheka people said that marriages

* A species of Bee-eater. (*Nyctiornis amicta*). † The Semang of Ijok call the eclipse of the moon "halup hilud" "butterfly swallow."

might not take place within the small (family?) division or "puwak," but that a man must seek a wife for himself outside. They gave as an instance the parents of Pachet the head of the "puwak," whose father, they said, came from the Jelai and his mother from Bukit Raya, Bndu Lipis. "Man" their Malay "owner" stated in the presence of the Pangan and with their concurrence that, they were even more particular about marriage of cousins than the Malays. The Kuala Cheka Pangan on the other hand said that marriage within the puwak was allowed, and pointed out an engaged couple, but the fact that the girl was the daughter of the late Pangan Rajah, who had lived with the Ulu Cheka "puwak" would seem to rather invalidate her claim to be called one of the Kuala Cheka people. Unfortunately the writer was unable to enquire further into the matter owing to the short time during which he met the Pangan; so that the existence of exogamy remains a subject for further investigation. The only other fact gleaned with regard to marriage customs was that although allowable, it was unusual for a man to have more than one wife.

LANGUAGE

The vocabulary obtained from the Pangan of the Ulu Cheka is published in a future number of this Journal with other vocabularies. Judging by this the people seem to speak a true Negrito dialect, for we have in it such distinctive words as chan (foot), wong (child), chias (hand), beling (arm), kukuyu (banana), tolabas (bear), makoh (egg), kolangis (liver or heart), ad (spear), hob (jungle), haing (mouth), tenud (lip), ai or aign (father), etc. Only a single numeral other than Malay forms could be obtained from the Pangan this being "nai," "one." There are one or two interesting words in the vocabulary which do not seem to be included in the comparative vocabulary in Skeat's *Pagan Races*, e.g., chonorong (neck), talu (old), talok (tiger).

ON TWO PANGANS LIVING WITH THE JAKUN OF KUALA RETANG.

(PLATES XXXI, XXXV.)

The two individuals dealt with in the following notes were members of a small and nearly extinct tribe of Negritos, called Orang Bukit (Hill-Men), who were said to live not far from the Kuala Besut* in Trengganu. Of the two, one was a man, probably about 26 or 27 years old, the other, a boy, 13 or 14. The Sakai said they had adopted them both while quite young, apparently on two different occasions of their making journeys to the Besut river in search of gutta-percha and other jungle produce. On questioning the Sakai as to the existence of other members of this Pangan tribe

* The Retang Sakai described the Besut country as in Kelantan, but as a matter of fact the whole of the Besut river lies within Trengganu, though it is not far away from the Trengganu-Kelantan border.



L. H. A. Fairs, Photo.

JAKUN OF KUALA RETANG, PAHANG, AND TWO PANGAN, SAID TO BE
FROM KUALA BESUT, TRENGGANU.

they at first replied that they were extinct, having been killed off by diseases, (*mati sakit*), but on thinking the matter over further they said that there were still six other members of it left, who had all been converted to Islam. The writer is rather inclined to think, judging by the two males seen, that this "puwak" of Pangan must have been very pure. The hair of both individuals though cut short, appeared to be typically Negrito and in facial appearance they were also true to type, the childish character of the expression being particularly well seen in the elder Pangan. In the boy the skin colour was an intense black, but this character unfortunately does not show up well in the photographs. In the man the skin was affected by a form of skin disease, rather a different species from that causing the disease called "kurap." Owing to this the skin colour was masked by a scaly crust due to the disease which gave it a roughened whitish appearance, but probably in reality his skin was almost as dark as that of the boy. The man had married a local Sakai woman. Neither of the Pangan could speak their own native language, having been adopted at such an early age that it had been forgotten and replaced as their mother tongue by the dialect of the Retang Sakai.

The head measurements of the adult Pangan are :

Head length.	Head breadth.	Cephalic Index.
178 mm.	143 mm.	80.3

ON A PANGAN BLOW-PIPE OBTAINED ON THE TEKAI RIVER.

This blow-pipe was obtained from Kemaman Jakuns living on the Tekai river, who said that they had purchased it from a wandering tribe of Pangan who had camped at the headwaters of the river. The weapon consists of an outer tube of dark brown bamboo built up of two pieces, the proximal portion of the tube being much the longest (distal portion length 38 cms. proximal 184 cms). The join is effected by shaving down the further end of the proximal portion until the nearer end of the distal portion fits neatly over it. (The shaved down portion, length 1.6 cms., is not included in the measurements given above). To strengthen the tube further the nearer portion of the distal section of bamboo which covers the join is bound with Ijok (P) fibre string, and coated with some kind of gum or resin, (perhaps ambalou). The muzzle end of the outer tube is also bound in the same manner. Below the joint the outer tube is ornamented with the three circular bands of incised lines disposed at equal distances, each band containing four lines. The part of the outer tube nearest the mouth-piece has three similar bands, the distances between them being 3.5 cms. The upper of the two spaces between the bands is filled up with diamond shaped cross-hatchings. The lower or proximal end of the outer tube is again finished off with a binding of vegetable fibre string. The mouth-piece of the weapon is spheroidal and is composed of a ball of some kind of wild

rubber shaped around the end of the inner tube. This proximal end of the inner tube is slightly larger than the interior of the outer tube being cased for a length of about 10 cms. with a covering of bamboo rind which is slipped on over it, and adheres to it by its nearer end, which is enclosed in the rubber of the mouth-piece. The further end of this casing of bamboo is shaved down for a length of 3 cms. so as to fit into one end of the outer tube. There is thus at the proximal end of the blow-pipe a portion nine cms. long projecting from the outer tube, and consisting of the piece of the inner tube cased with bamboo and the mouth-piece. The inner tube proper is, as in the majority of aboriginal blow-pipes, composed of two internodes (or sections of internodes) of bamboo placed end to end and joined together by a tubular covering section of bamboo or other material attached with some kind of vegetable glue. In this case the covering section appears to be made from the outer skin or wrapping of some kind of palm or rattan. The inner tube does not reach quite to the further or muzzle end of the outer, and a small ring of bamboo is pushed down inside the latter until its edges abut on those of the inner tube. The proximal section of the inner tube is very short, measuring only 59 cms. from the end of the mouth-piece to the end of the covering section. The covering section is 17 cms. long, and the distal section of the inner tube measured from the further end of the covering section to its muzzle 15.3 cms. The total length of the whole weapon is 232 cms.

THE JAKUN OF THE TEKAI RIVER

A short visit was paid to the Tekai river in company with the Dato Muda Bujak, a subordinate officer of the Tembling and Tekai rivers. Sections of two tribes were seen, which for the sake of convenience will be referred to in the following pages as the wilder and tamer tribes, respectively.

THE TAMER JAKUN.

(PLATE XXXII.)

The people have reached as high, or possibly a higher, state of civilization than that of the ordinary Malay peasant of Pahang. They were wearing very clean and new looking clothes of Malay type and had a far more alert air than the local Tembeling Malays, who were the most apathetic people the writer has ever met. With this progress in civilization the Jakun have of course become much less interesting from an ethnological point of view. In their customs and beliefs they no doubt remain to a certain extent unchanged, but in dress, manufactures, and weapons they now almost entirely follow Malay fashions. With regard to their manufactures, the household implements used were exactly similar to those of the local Malay; the blow-pipe was no longer made, and the only specimen seen in the settlement, that described above, had been obtained from a wandering party of Pagan.



I. H. N. Evans, Photo.

JAKUN (SAID TO BE ORIGINALLY FROM KEMAMAM), TEKAI RIVER, TEMBELING, PAHANG.

TRIBAL NAME AND HISTORY.

The correct tribal designation of the people appears to be Menik Rantau (Men of the river reaches), the polite term used by Malays when speaking to them being Orang Dalam. They are recent settlers on the Tekai river having come from near the mouth of the Kemaman* river and, according to their own account, are closely related to the aborigines of Kuantan.†

HABITATIONS.

The houses of the tamer tribe were much like those of the local Pahang Malays. The chief's house consisted of a verandah and a single room with a cook-house (dapor) built out at the back.

DRESS AND ORNAMENT.

As mentioned above, the general dress of these people differs but little from that of the Malay. Though rapidly being discarded a few really non-Malay articles of dress were collected from them. Two of these were women's girdles of cord made from plaited strips of *bemban* (*Clinogyne grandis*) bark, one being coiled twelve the other forty-two times round the body. both girdles were fastened by the ends of the strings being tied to the coils. The only other object of personal adornment obtained was a neatly plaited bracelet of pandanus leaves, which was being worn by one of the children.

MUSICAL INSTRUMENTS.

Two musical instruments were seen and purchased, one a short bamboo flute with seven stops, of the type called "bungsi" by the Malays, the other a jews' harp made of some kind of palm wood, this being also similar to instruments used by the Malays. It was contained in an open bamboo receptacle made of an internode, with one of its adjacent nodes to form the bottom.

AGRICULTURE.

The Jakun had a fairly extensive clearing planted with Indian corn, dry or hill rice, and *ubi kayu* (tapioca.)

BOATS AND FISHING.

The ordinary boat in use among both the wilder and tamer people was a small dug-out prahu, exactly similar to that of the local Malays and of the kind usually called *prahu sampan* or *prahu sagor*. On occasions when a wooden boat was not to be obtained the Jakun were, however, said to make a rough canoe from a sheet of tree bark. Fish traps were also similar to those of the Malays. Although much used by the Malays, perhaps some mention should be made of rather a singular method of fishing which was observed. In this a small rod made from the mid-rib of a *bertam* palm leaf was used. To this were bound several rings of brass wire to carry the line. In place of a

* The Kemaman river is in Trengganu not far from the Pahang-Trengganu boundary. † Kuantan is on the coast of Pahang.

reel a winder of rattan cane was used, which was held in place against the butt of the rod with the right hand. No sinker of any kind was used on the line and the brass wire hook was baited with a whole fruit of the *jambu ayer*, bushes of which grow in abundance along the river banks in this part of Pahang. The line is cast as in fly fishing but owing to the rod only measuring about four feet in length, the casts are necessarily very short. After a cast has been made the line and bait are allowed to travel down stream, the rod point following them the while. When the line has reached the limit of its journey it is withdrawn and the performance repeated. The majority of the fish caught by this method are *ikan lampar*, which looks something like a cross between a roach and a carp. Two of these which were brought into the village would probably have weighed about a pound and a half each.

PHYSICAL CHARACTERS AND MEASUREMENTS.

In general appearance the Kemaman Jakun rather reminded the writer of the Besisi of Selangor. The facial type was somewhat ruder than that of the Malays and the angles of the lower jaw were usually strongly developed, giving the face rather a square look. In skin colour they were as light or possibly lighter than the surrounding Malay population. The hair was straight or only slightly wavy. The head measurements which are given in the annexed table were taken from four adult males.

Serial No	Head Length	Head Breadth	Cephalic Index
1	176	149	84.6
2	181	147	81.2
3	192	147	76.5
4	170	141	82.9

RELIGION, SUPERSTITIONS, ETC.

Very little but negative evidence could be obtained with regard to the religion and superstitions of the tribe. Certain spiritualistic ceremonies, such as the Malays term *berhantu*, are performed in cases of sickness by the medicine man of the tribe.

PAWANG'S SWITCH.

An article used by the Pawang (medicine man) in the *berhantu* ceremonies was obtained from the Pengghulu, or head man who also acted as pawang of the tribe. The instrument consists of a bunch of rattan sticks, made by bending three lengths of rattan cane double and placing a seventh stick in the middle of the bunch. The bundle is fastened together at the end where the lengths of cane are bent up, with an ornamental binding of split rattan. The instrument is similar to rods used by Malay pawangs in divination, chiefly for tracing thieves or recovering lost property. A very good illustration of three collected by Mr. W. W. Skeat is given in "Man" No. 40 (1902) together with an article on their use by Prof. E. B. Tylor.



J. H. N. 1005, 1006

JAKUN (SAID TO BE FROM PULAU TAWAR, PAHANG RIVER) TEKAI RIVER,
TEMBELING, PAHANG.



J. H. N. Feans, Photo.

JAKUN (SAID TO BE FROM PULAU TAWAR, PAHANG RIVER,
TEKAI RIVER, JIMBLING, PAHANG)

LANGUAGE.

The vocabulary obtained from the Kemaman section differs considerably from that used on the Retang river, one of its peculiarities being the use of the word "mesong" for "five." The only tribes recorded by Skeat in the *Pagan Races* as using this word, or forms of it, are those of the Ulu (head waters) of the Tembeling, the Cheres, the Endau and the aborigines of the Sorting river. The people of the wilder tribe, said that they spoke the same dialect as the Kemaman people. Owing however to the short time spent in the locality the correctness of their statement was not put to the test.

THE WILDER TRIBE.

(PLATES XXXIII AND XXXIV.)

This tribe, or rather section of a tribe, was said to have recently come from Salang on the Tekam river, Pulau Tawar, where they belonged, and had settled down close to the tamer or Kemaman Jakun. The writer, finding the Tekam people the most interesting group of the two, devoted a good deal of the short time spent among the Tekai aborigines (two days) to investigating as far as possible their beliefs and superstitions. The results obtained will be found below. In dress like those of the tamer tribe this chiefly followed Malay fashions, but the clothes and the bodies of many of them, especially of the old men, left much to be desired in cleanliness. One very old man, as can be seen in plate xxxiii, is wearing a T-bandage loin-cloth of European material. The skin disease known as "kurap" (*Tinea circinata*) was common, being probably freely propagated owing to dirty habits. In personal appearance they were just as light as the other section. Their hair was, as a rule, either straight or slightly waved, but in the man who is the second from the right in plate xxxiii it is distinctly curly. Chin beards were not uncommon among the older men, but the hair in them was rather weak and straggly.

HABITATIONS.

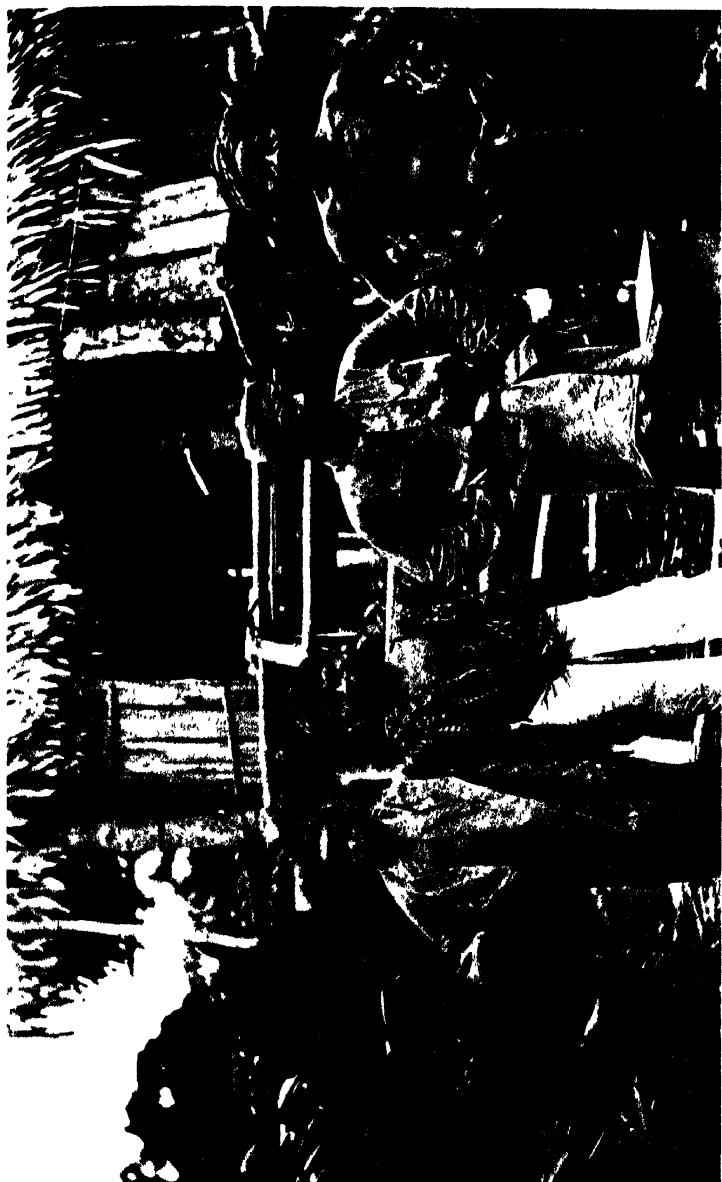
The houses of the wilder tribe were not visited but they were said to be similar to those of the Kemaman people.

DRESS AND ADORNMENT.

The only objects of dress and adornment other than the Malay clothes mentioned above were girdles of rattan, worn by the men, and bracelets of the fungus rhizomorph called *akar batu*, which were used by both men and women alike. The rattan girdles were made of whole peeled canes of small diameter, a cane about fifteen feet long being coiled several times round the body with the ends, which were shaved down for the purpose, tied together. An example of this type of girdle can be seen on the old man in plate xxxiii.

WEAPONS.

The only weapon seen was a single blow-pipe. This, together with the quiver belonging to it, were purchased for the Perak Museum. Both blow-pipe and quiver were of the same type as the specimen of each from Kuantan, Pahang, described by Mr. Skeat in "Man" 1902, No. 108. The blow-pipe consists of two lengths of hard wood, probably of the kind called penaga (*Calophyllum*) laid together and shaved down on the outside until they form a long cylindrical rod. The tube is made by cutting a groove with a semi-circular section along the adjacent inner faces of both of the lengths. The two sections of the tube are bound together with a long strip of rattan cane, which is wound spirally round them from the base to the muzzle. In most of the blow-pipes of this type the binding is covered with a thick coating of a black gutta-like substance, but the specimen obtained on the Tekai is coated with wild rubber of a red-brown colour. The mouth-piece, from the top of which the binding begins, is formed of the same kind of rubber moulded into a roughly conical shape. The muzzle is covered with a rather thicker coating of rubber than the rest of the tube. The total length of the blow-pipe is 169.5 cms., and that of the mouth-piece 12 cms. The Sakai informed the writer that both the blow-pipe and the quiver were made by themselves when living on the Tekum river, but said that the former had once been longer and had been cut down to its present dimensions owing to its having been broken. The quiver which is a very large specimen, with a length of 37.5 cms. and a diameter of 12.5 cms., has a flattish top of plaited pandanus leaves, which rises into four slight peaks at the edges. The plaiting of the pandanus is not finished off at the centre of the cover, a number of free ends thus being left, which cross and recross each other. The quiver contains a bundle of reed dart-holders of the usual type and seven short poisoned darts, and besides these two small spatula of *ipoh* poison are slipped into it at its edges. In the centre of the bundle of dart-holders are several memplas leaves (*Tetracea assa*?) which are used for polishing dart stems, a bone awl, vegetable fluff for packing behind the dart as a wad when placed in the blow-pipe, a spare dart head, and the two long tail feathers of a Larger Racket-tailed Drongo. In no case do the butt ends of the stems project through to the upper surface of the dart head as in the specimen described by Skeat. The quiver is ornamented on the outside at top and base with bands of roughly scratched-in patterns. For these the writer could obtain no names, except that the Sakai said that one pattern at the top was meant to represent a jungle flower, and one at the base bamboo shoots. The middle of the quiver is surrounded with a band of plaited cane to which are fastened the cords which attach it to the hunter's body, the rattan band being tightened around the quiver by means of two small wooden wedges which are driven in from above. A similar binding encloses the quiver at the base, but is without



J. H. N. Evans. Photo

JAKUN OF RETANG RIVER, PAHANG WITH ADOPTED PANGAN BOY
(Third from left of Picture).



I. H. N. Evans, Photo

JAKUN OF KUALA RETANG, NEAR KUALA, TEMBELING, PAHANG.

wedges. The cover is attached by means of a fine cord which is tied to the base of one of the waist cords at one end, and is fastened to the edge of the cover at the other. There are in the Perak Museum several specimens of this type of blow-pipe and quiver, namely, a blow-pipe and quiver from the Ulu Rompin, Pahang, a blow-pipe and quiver from Kuantan, Pahang, collected by Mr. C. Wray; five blow-pipes from Pekan and Kuala Pilah and a single quiver from Batam Island, Singapore Straits.

PHYSICAL CHARACTERS AND MEASUREMENTS

The remarks already made with regard to the tamer tribe apply almost equally well to the Pulau Tawai people, though perhaps the Sakai element was stronger than in the former group as very wavy or slightly curly hair was seen in several individuals, notably in a man, the second from the right in plate xxxiii.

The measurements given below were all three taken on adult males.

Serial No		Head Length.		Head Breadth		Cephalic Index
1	...	181	...	144	...	79.5
2	.	188	...	142	...	75.5
3	...	182	...	146	...	80.2

THE JAKUN OF THE RETANG RIVER

(PLATES XXXV AND XXXVI.)

With regard to these people, the remarks already made about the civilized condition of the tamer Tekai tribe apply equally well. They had adopted Malay clothing, manufactured no articles which could be described as being distinctively aboriginal, and the blow-pipe was no longer used. According to their own account, they belonged to the same tribe as the people of the Krau river, but they appear to have led rather a wandering existence, their journeys in search of jungle produce occasionally taking them as far north as the Besut country in Trengganu, whence, as described above, they had adopted two Semang. Until recently they said they had been living on the Tekai river, but had left that locality about two years before, owing to their clearings being constantly visited by wild elephants, which destroyed the crops. Their present settlement which lies only a few hundred yards up the Retang river consists of a large clearing containing four houses. The crops planted are, Indian corn, padi, and a little sugar cane, tapioca, and *kaladi*. Sirih too is grown to a small extent. Their houses resemble those of the Pahang peasantry. The following articles of property were seen in the house of the Battin or chief: two drums, of the type called *gendang* by the Malays, white pandanus mats, water vessels made from gourd or coconut shells, small pandanus baskets, winnowing trays, and a large gong of the sort known as *tetaseak*;

all these articles being similar to those used by the Malays. The type of boat in use among the Sakai was also Malay, the small dug-out canoe called *prahu sampan* or *prahu sagor*.

TRIBAL OFFICERS.

The names of only two tribal officers were obtainable. These were (1) Batin (2) Pemangku.

The Batin, as mentioned above, was living at Kuala Retang, but the Pemangku with a small party of followers was said to have rejoined the rest of the tribe on the Krau river, when the Tekai settlement was deserted. The tribal titles are said to be hereditary in the male line.

PHYSICAL CHARACTERS AND MEASUREMENTS

In appearance all the Retang people approximated to either the Sakai or Jakun types but perhaps the latter was the commoner, since in the majority of individuals the hair was as straight as in Malays. All the men had their hair cut close to the head with the exception of the young man shown in plate xxvi, upper figure, who had the back and sides of the head shaved, leaving a patch of hair over the forehead. No traces of Negrito blood were seen among the Retang people, though if the two adopted Pangan described above have children there will be a distinct strain of this blood introduced into the tribe. If the custom of adopting children of other tribes, or the adoption of men from outside into a tribe through marriage, be common, as they most probably are, it becomes easy to understand how individuals in Sakai or Jakun tribes may occasionally show distinctly Negrito characters or *vice versa*.

The head measurements obtained on the Retang, which were all taken from adult males, are given in the annexed table:

Serial No.		Head Length.		Head Breadth.		Cephalic Index.
1	...	179	...	145	...	81.0
2	...	184	...	146	...	79.3
3	...	181	...	139	...	76.8
4	...	172	...	144	...	83.7
5	...	181	...	148	...	81.8

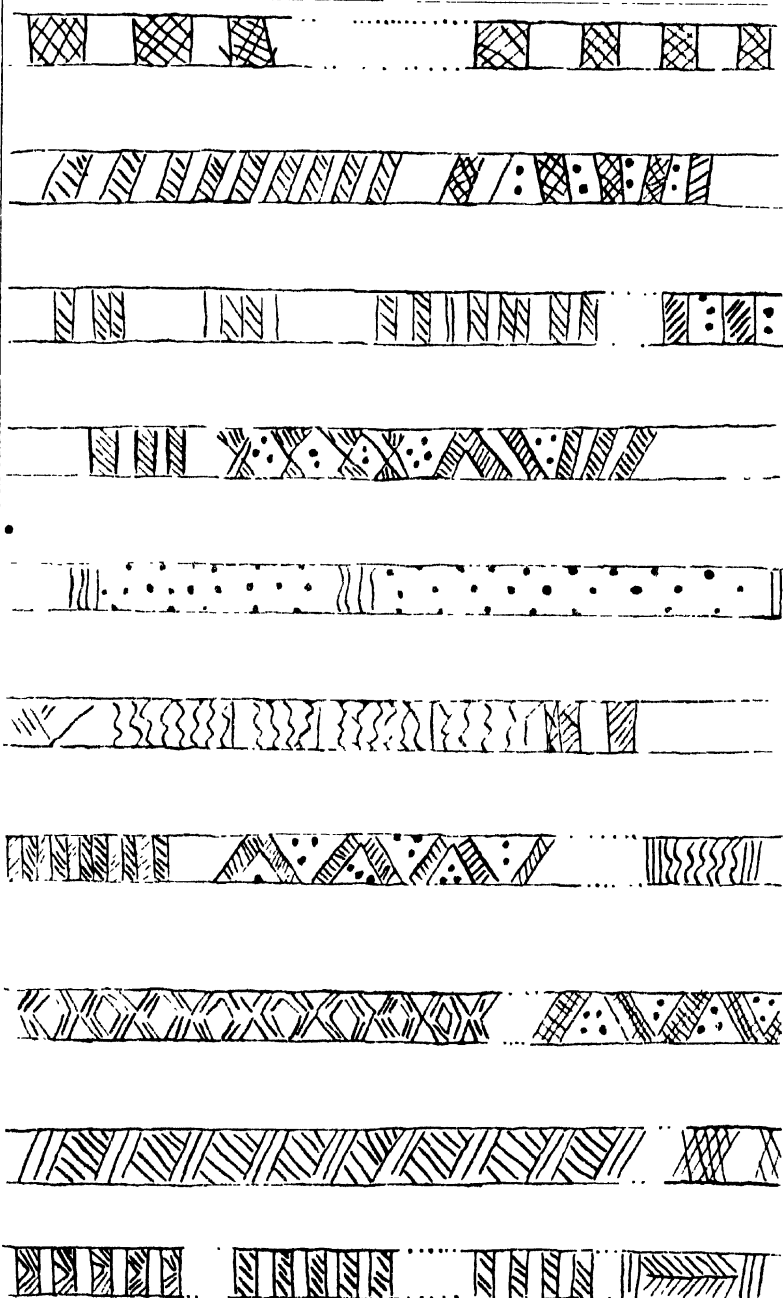
The people of the Retang river, like those of the Tekai, are probably by origin a mixed-blooded Jakun-Sakai tribe. The measurements in so far as they go rather showing tendency towards brachycephaly.

TOOTH FILING.

Both men and women have the six front teeth in the upper jaw filed down.

PERSONAL NAMES.

Three names of men obtained were all of Malay origin; they were as follows, Ibrahim, Kasim, and Basol.



PATTERNS ON WOMEN'S RATTAN GIRDLES



FIG I

FACE PAINT PATTERNS ON PANGAN WOMAN



FIG. II

FACE TATTOOING ON PANGAN MAN

RELIGION, SUPERSTITIONS, ETC.

Though the people were very friendly, no account of their religious beliefs could be obtained, and most probably they have none. The bodies of the dead were said to be buried, and water, food and papaya fruit placed on the grave.

It is forbidden to mention the names of father-in-law, mother-in-law, brother-in-law or sister-in-law.

LANGUAGE.

The dialect spoken on the Retang river people seems to come under the division called Eastern Sakai by Skeat. There are many words of Malayo or Malayo-Polynesian origin in the vocabulary and several which are not found in the comparative vocabulary in Skeat's *Pagan Races*. Among these are "tiwok," (fever); "rek-rek," (cough); "idut," (mother); "kesir," (husband); "krakun" or "krakoin," (woman); and "mahong," (wind).

VOCABULARIES.

English and Malay.		Tekai river.		Kuala Retang.
Head (kepala)	..	.. koie	...	... koio
Ear (telinga)	...	... untugan	..	... untang
Eye (mata) ...	...	. mot	.	... mat
Nose (hidong)	...	... moh	...	... hidon
Nostril (lubang hidong)		. serong moh		... leng hidon
Cheek (pipi)	...	. meng		. pipi
Mouth (mulut)	...	... kenut	...	.. mulut
Lip (bibir) ...	..	... bibir	...	. bibir
Tongue (lidah)	..	... lepes	...	.. lentak
Tooth (gigi)	...	... lemoin	..	... lemoin
Chin (daggu)	...	... jangkut	...	... dagu
Neck (leher)	...	... leng-ek		... lengek
Throat (tengkok)	...	. tengkok	...	... tengkok (k sounded)
Shoulder (bahu)	.	... kempoh		.. bahu
Arm (lengan)	...	... bleng	...	.. lengan
Elbow (siku)	...	... siku	...	... siku
Hand (tangan)	..	.. ti	...	... ting
Thumb (ibu tangan)	...	... gadut ti	...	... idut ting
Finger (jari)	...	... jari	...	... jari
Finger-nail (kuku)	...	... tekok	...	... cherewis
Thigh (paha)	...	... helu	...	... beluk
Knee (lutut)	...	... kaltong	...	... kerk lual
Shin (tulang kering)	...	... kenhir	..	... jah arng kring
Foot (kaki) ...	...	... jong	...	... jong
Heel (tumit)	...	... tumit	...	... kukun

English and Malay.	Tekai river.	Kuala Betang.
Sole (tapak kaki) ...	... tapak jong (k pronounced)	tapak jong
Toe (jari kaki) ...	... jari jong ...	... jari jong
Breast (dada) ...	... dening ...	... dadah
Back (belakang) ...	... chelora ...	... kerok
Heart (jantung hati) ...	... genos ...	... jantung
Liver (hati) ...	... grace ...	... huihom
Stomach (perut) ...	... leput ...	... kut
Navel (pusat) ...	... pusat, paring	... pusat
Intestines (isi perut) ...	.. urat perut...	... lepeit kut
Blood (darah) ...	... maham ..	... mehem
Bone (tulang) ...	... je-ung ...	... jah-arng
Skin (kulit) ...	.. getu ...	... ketuk
Hair (rambut) ...	... suk .	... sok
Old (tua) ...	... tuhak ...	... tuhak
Young (muda) ...	... muda ...	... muda
Fat (gemok) ...	... gemuk (k sounded)	gemok (k sounded)
Thin (kurus) ...	... wat ...	... kurus
Hot (panas) ..	... pehel ...	.. pret
Cold (sejok) ...	... kerot ...	.. sengeit
Blind (buta) ...	... luk ...	... butak
Deaf (tuli) ...	... churig .	... pekak, tuli
Dumb (bisu) ...	.. budol ...	... leluk
Fever (demam) ...	... kerot ...	... tiwok
Itch (kurap, kudis) ...	... barlal, kudis	... kurap, kudis
Vomit (muntah) ...	... kwuk ...	... kukup
Gripes (sakit perut) ...	... jelpoit ...	... inyak kut
Diarrhoea (cherot) ...	... cerot ...	... cheret
Cough (batok) ...	... kokol ...	... rek rek
Dead (mati) ...	... kebus ...	... kebus
Putrid (busok) ...	... si-it ...	... si-it
Father (bapa) ...	... ipah ...	... ibit
Mother (ibu) ...	... moie ...	... idut
Husband (laki suami) ...	... kenlug ...	... kesir
Wife (bini) ...	... kempun ...	... kenah
Male (jantan) ...	... iper ...	... koin
Female (betina) ...	... gadoh ...	... keung
Man (orang laki-laki) ...	... iper ...	... koin

[Appear to be no separate words for male and man, or if there is could not get them]

English and Malay.	Tekai river.	Kuala Retang.
Woman (orang perempuan). gadoh	...	... krakun
[The same thing seems to apply to the words for female and woman also to son and boy, daughter and girl]		
Person (orang) ...	... semark ...	... juh
Son (anak-laki) ...	... iper enwok	... iwak krakoin
Daughter (anak perempuan)	enwok gadoh	.. iwak krakun
Child (kanak-kanak) ...	enwok kanek	... iwak kwakweit
Boy (budak laki-laki) ...	kenkon kenlug	... iwak krakoin
Girl (budak perempuan) ...	kenkon gadoh	... iwak krakun
Maiden (anak dara) ...	kenkon mudak	... iwak kaduah
Elder brother (abang) ...	yi-eh ...	... yi-em
Elder sister (kakak) ...	gab-ū ..	... yi-em
•Younger brother (adek) ..	adek ...	... adek krakoin
Younger sister (adek perempuan)	adek gadoh	... adek krakun
Elephant (gajah) ...	... gajah ...	... gajah
Rhinoceros (badak) ...	... badak ...	... badak
Tapir (tenok, badak tampong)	putaih ...	.. badak murai
Gaur (seladang) ...	... sčladang ...	... sčladang
Bear (beruang) ...	... kemol ...	... bčruang
Deer (rusa) ...	... rusa ...	... suk
Chevrotin (napoh, peilandok)	pelandok ...	... napoh. pelandok
Wild-pig (babi hutan) ...	jalu ...	... rap
Porcupine (landak) ...	jekos ...	... jekus
Dog (anjing) ...	chor ...	... ču-uk
Wild-dog (anjing serigala)	tedu ...	... ču-uk serigala
Tiger (harimau) ...	kwep ...	... klak
Black panther (harimau kumbang)	kwep kumbang	... klak kumbang
Wild-cat (kuching hutan) ...	?	... kuching brek
Oat (kuching) ...	... miow ...	... kuching
Bear-cat (benturong) ...	... kantua ...	... benturong
Civet-cat (musang) ...	... musang ...	... musang
Large squirrel (tupai nandong, kerewak)	alaw ...	... peruk belang
Small squirrel (tupai kampong)	chedek (k sounded)	peruk hitam
Flying lemur (kubong) ...	.....	kubung

English and Malay.	Tekai river.		Kuala Retang.
Loris (kongkang, kera duku)	wat	...	... kongkang
Bamboo-rat (dekan)	... dekan	...	... dekan
Rat (tikus)	... karao	...	... tikus
Gibbon (ungka)	... chenloi	...	... ungka
Monkey (lotong)	... baseng	...	... tebuat
Monkey (kera)	... teraw	...	... boie
Monkey (berok)	... tadig	..	... daung
Fruit-hat (keluang)	... kawat	...	... kaweit
Bat (kelawar)	... pur pur	...	... kelawar
Crocodile (buaya)	... kerlok	...	... bah ciah
Monitor-lizard (biawak)	... griang	...	... peruk
Grass-lizard (bengkarong)	bengkarong	...	... merong
Flying-lizard (chichak kubin)	ketut	...	.. klechek
Land-tortoise (kura-kura, baning)	yeah, sul	...	... kurak, baning
Water-tortoise (labi-labi)	... pa-as	...	... labi
Snake (ular)	... ti jaw	...	... tulun
Python (ular sawah)	... talun	...	.. telan
Frog (katak)	... jangok	...	... kabatak
Fish (ikan)	... ka	...	.. kak
Horn (tandok)	... tandok	..	.. tandok (k sounded)
Tusk of elephant (gading)	... gading	...	.. gading
Tail (ekur)	... hateh	...	... sentak
Hornbill (enggang)	... terang	...	... chemgang
Hawk, eagle (lang)	... kalang	...	... klang
Owl (burong hantu)	... (pongok)	...	... tutut
Egret (bangau)	... (bangau)	...	... bangau
Jungle-fowl (ayam denak)	... ayam denak	...	... pok denak (k sounded)
Argus-pheasant (kuau, kuang)	... kaung	...	... kuang
Green pigeon (punai)	... (punai)	...	... punai
Crow (gagak)	... ah-ok	...	... roh-ak
Kingfisher (pekakak raja udang)	'kakah	...	... chom pen prang
Woodpecker (pelatok)	... terenek	...	... belatok (k sounded)
Magpie-robin (murai)	... murai	...	... murai
Egg (telur)	... behleh	...	... peng-lung
Feather (bulu ayam)	... suk ayam	...	... sok pok (ksounded)
Beak (paroh)	... (paroh)	...	... parok

English and Malay.	Tekai river	Kuala Retang.
Ant (semut) ..	... petom ...	... blas
Red ant (kerongga)	... kasu ...	... lek sok
White ant (anai-anai)	... darun ...	... anai
Bee (lebah) ...	... lawoi ...	.. loi-eh
Honey (nyer madu)	... dak... ..	... toh loi-eh
Wax (lilin) ...	... lilin ...	... lilin
Hornet (tebuan) ...	... hong ...	... tebuan
Wasp (penyengat) ...	... pengket ...	.. semoit
Fly (lalat) ...	... lalat ...	... lalat
Black scorpion (kala)	... kelantam ..	... ketep-lil
Small scorpion (kala kelantam jengking)	... ..	... jengking
Centipede (lipan) ...	... kai-ip ...	... keh-ep
Millipede (sepak bulan)	... guahr ...	... sepak bulan
Cockroach (lipas) ..	.. semertah ...	... led-ek
Spider (laba laba) ...	.. chungbun ...	... chianbung
Coconut-beetle (kumbang)	kumbang ...	... kumbang
Mosquito (nyamok)	... semoin ...	... kemud
Tree (pokok kayu) ...	... tampong delong	.. tekoh nehok
Bough (dahan) ...	... roh ...	... dahan nehok
Root (akar pokok) ...	... tampong jemok	... akar nehok
Leaf (daun kayu) .	... salar delong	... hlat nehok
Flower (bunga) ...	... bunga ...	... bukau
Fruit (buah kayu) ...	.. buah delong	... pluk nehok
Fungus (chendawan)	.. kulat ...	... tis
Bamboo (buloh, aur)	... lieu ...	... ding
Rattan (rotan) ...	... tali... ..	... sek
Thorn (duri) ...	... jerlah ...	... julak sek
Rice (padi) ...	... bar bar ...	... bah
.. (beras)...	... beras ...	... rokuak
.. (nasi) ...	... nasi ...	... ran
Banana (pisang) ...	... pisang ...	.. cheng
Areca-nut (pinang)	... pinang ...	... pinaug
Durian (durian) ...	... durian ...	... sempak
Tampoi (tempui) ...	... chao ...	... tampoi
Rambutan (rambutan)	... lengkiang ...	... (pluk) genteg
Sireh-leaf (daun sireh)	... sireh ...	... hlat gereg
Screw-palm (pandan, meng-kuang)	saket, (for both)	... sket, pandan (sket loie sohok, leaf)
Terap-tree (terap) ...	... terap ...	... sohok
Forest (hutan) ...	... bri ...	... br'k

English and Malay.	Tekai river.	Kuala Retang.
Yam (ubi kayu) ...	... bakoi delong	... kehnehok
„ (keledek) ...	... keledek ...	... silak
„ (keladi) ...	... lebor ...	... lebul
To walk (berjalan)...	... lasnap ...	... chi chip
„ run (lari) ...	... lah-paru ...	... perduk
„ stand (berdiri) ...	... au ...	... jinjuong
„ sit (duduk) ...	... komi ...	... nerh nok
„ lie down (berbaring) ...	... dum ...	... dendum
„ sleep (tidur) ...	... yetek ...	... chek
„ snore (berdengkur) ...	... sedul ...	... bersenur
„ jump (melompat) ...	... lompat ...	... mehamu
„ climb (memanjat) ...	... hial ...	... weigh
„ hold (pegang) ...	... kum ...	... chep
„ lift up (angkat) ...	... angkit ...	... ampuh
„ throw (lempar, lontar) ..	... pingkah ...	... lempar
„ scratch (garu) ...	... geh ...	... kukeit
„ spit (ludah) ...	... toh ...	... tuoh
„ bite (gigit) ...	... goin ...	... gigit
„ pinch (chubit) ...	... chekit ...	... cheket
„ wash (membasoh) ...	... sut ...	... soit
„ bathe (mandi) ...	... moit ...	... mah-mu
„ cook (memasak) ...	... pachin ...	... n'chel
„ eat (makan) ...	... inchar ...	... chichak
„ drink (minum) ...	... jeh-oh ...	... woh
„ chew (mamah) ...	... mamah ...	... reng
„ fly (terbang) ...	... kapoie ...	... terbang
Sun (matahari) ...	... mah tengie	... mat ketok
Moon (bulan) ...	... bulan ...	... bulan
Star (hintang) ...	... bintang ...	... bintang
Cloud (awan) ...	... awan ...	... awan
Mountain (gunong) ...	... gunong ...	... gunong
Hill (bukit) ...	... menum ...	... chong
Day (siang hari) ...	... tengi ...	... ketok
Night (malam) ...	... plit ?
Thunder (guruh, petir) ...	... kuroi ...	... kareh
Wind (angin) ...	... johung ...	... mahong
Rain (hujan) ...	... gemar ...	... mik
Storm (ribut) ...	... bruak ...	... bruak
Fire (api) ...	... us ...	... os
Water (ayer) ...	... tom ...	... toh
Smoke (asap api) ...	... i-oi us ...	... asap

English and Malay.		Tekai river.	Kuala Retang.
One (satu) ...	... moi	... satu	
Two (dua) ...	... mar	... dua	
Three (tiga) ...	... 'mpe ; five, mesong ; tiga six, anan		
Four (empat) ...	... empun	... empat	
Ashes (abu) ...	... tempup	... habu	
Salt (garam) ...	... tepol	... pol	
Tobacco (tembakau)	... tembakau	... takau	
Stone (batu) ...	... batu	... temok (k sounded)	
Earth (tanah) ...	... atai	... teh	
A Clearing (lading)	... atai	... piruk	
House (rumah, pondok)	... si-uh	... i-ek, senom	
Roof (atap rumah)...	... palong	... keluong	
Chopper (parang) ...	... woie	... nyem	
Axe (kapak, beliong)	... kapak, beliong	... kapak, byliong	
Knife (pisau) ...	... woie	... nyem	
Cloth (kain) ...	... kain	... kain	
Girdle (gondit, kendit)	... nom	... tali wong	
Spear (lambung) ...	... tohok	... bulus	
Blow-pipe (sumpitan)	... seput	... blau	
Mouth-piece (pangkal sum- pitan)	... telong seput	... han blau	
Muzzle (mata sumpitan)	... sentol seput	... mat blau	
Quiver (tabong bekas damak)	... luk	... tabong damak	
Quiver-cords (tali tabong)...	... dreh luk	... tali tabong	
Dart (damak) ...	... kohol	... damak	
Point of dart (mata damak)	... pralus koh-ol	... chemak damak	
Butt of dart (pangkal da- mak)	... beloi koh-ol	... libut damak	
Dart-holder (sarong damak)	... plait koh-ol	... sarong damak	
Poison (ipoh) ...	... dok	... ipoh	

REMARKS ON SOME RACES OF CYNOPTERUS.

BY DR. KNUD ANDERSEN AND C. BODEN KLOSS.

"IN a paper on a collection of mammals from the Siamese Province of Bandon recently published in 'Journal, Federated Malay States Museums.' (Vol. V., p. 115; 1915) Messrs. Robinson and Kloss raise the question whether it would not 'be more logical to regard *angulatus* as a sub-species of *C. sphinx* rather than of *C. brachyotis*.' Perhaps I may be allowed to say a few words in elucidation of this subject. If you desire to separate *C. sphinx* (all forms taken together) as a *species* from *C. brachyotis* (all forms), then you must evidently draw at least a tolerably clear line between them. That is what I have tried to do by placing all the longer-eared forms together under the heading *C. sphinx* and all the shorter-eared under *C. brachyotis*. Destroy that line, as drawn by me, and so far as I can see, you destroy every possible line of demarcation between *C. sphinx* and *C. brachyotis* as *species*, for I can find no other clear character binding all the forms of *sphinx* together as contrasted with all the forms of *brachyotis* than the difference in ears. But destroying that line, that is exactly what you do in the moment you transfer *angulatus* (a shorter-eared form) to *C. sphinx* (the longer-eared group). This, therefore, is not a question of whether you would like to see *angulatus* placed under *sphinx* rather than under *brachyotis* still keeping *sphinx* and *brachyotis* as separate species, but whether you will leave matters as they stand or rather bring all the forms of *sphinx* and *brachyotis* together under one specific name. *

"But it may reasonably be asked, why not unite them all? Because it would, at least over one large geographical area (and possibly over more than one, when we know the fauna of Indo-Malaya better), lead to a rather awkward result. In Sumatra you would have *three* different sub-species of the same species occurring together, *tithæcheilus*, *angulatus* and *brachyotis*. It is a thing I have succeeded in avoiding so far, and which I think certainly ought to be avoided if possible. Quite apart from that, place the three forms, a *tithæcheilus*, an *angulatus*, and a *brachyotis* in a series, together with their skulls, and few, if any, would hesitate for a moment in declaring that *angulatus* and *brachyotis* are obviously much more intimately related to each other than they are to *tithæcheilus*, or to put the same thing in other words, that *angulatus* and *brachyotis* are offshoots from one (the *brachyotis*) branch of the genus, *tithæcheilus* from a certainly related but clearly different branch (*sphinx*). *Angulatus* and *brachyotis* are bound together not only by the relatively shorter ears, but also by the relatively shorter cranial rostrum (less than one-fourth of skull), in both of which characters they differ from *sphinx* and *tithæcheilus*. But if that is so, if our material seems clearly to indicate the existence of two

'branches,' or 'stocks,' or whatever else they may be called, why not try to express it in our nomenclature of the forms, by separating all the forms into two groups ('species'), *sphinx* and *brachyotis*? But if that is admitted, then *angulatus* must come under *brachyotis*, or else we cannot draw a line between the two species.

"These are some of the considerations that guided me when working out this section of the genus *Cynopeternus*. Of course, if a form really does exist, in the north of the Malay Peninsula, in the Islands off south-east Siam, and possibly somewhere else, which possesses the skull of *angulatus*, but the ears of *sphinx* then an entirely new and unsuspected element is introduced into the genus. But unless and until the existence of such a form is properly established I should think it rather premature to discuss its probable effect on our arrangement." Knud Andersen.

The above remarks were made by Dr. Andersen in the course of a report on some Indo-Chinese fruit-bats but as they apply to material dealt with in this Journal and can well stand by themselves I have extracted them for publication here. As it is possible, from the criticism of our suggestion, that Mr. Robinson and I did not make ourselves clear, a few comments may not be out of place.

Dr. Andersen is quite right in attempting to draw a clear line between the species if possible (and in our notes we indicated no desire to "lump" forms of *sphinx* and *brachyotis* together). The differential characters he gave in so doing were, for the former, "ears long, 18-20.5 mm. from orifices; general size medium or large; forearm 66-83 mm." and for the latter "ears short, 13-18 mm. from orifice; general size small or medium; forearm 54.5-72 mm." while it now appears that the size of the ears is the primary feature, others being of somewhat less importance.

Dr. Andersen has suggested that our method of measuring is different from his, but we have used, as a matter of fact, that given above by him. It is the only measurement of the outer external side of the ear that can be taken with any uniformity and is so obvious that it suggests itself to every collector. The only possible alternative is the length of the inner external side from tip to base on the crown—quite another thing and not to be confused with the former.

As we have obtained a number of bats (*angulatus*, Miller) from the Malay Peninsula and elsewhere with ears from 18.5 to 21 mm. in length, as in the type series, it seemed to us that it would have been more logical on Dr. Andersen's own classification (and not on sentimental grounds), to regard that form as a small race of *sphinx* rather than a large one of *brachyotis* with which species it otherwise closely agrees: we had no desire to destroy the dividing line or to unite all the various forms; all we suggested was the transfer of one particular form from one side to the other.

Now, in his remarks, Dr. Andersen emphasizes the value of skull-characters which in the "Catalogue of Chiroptera" were only made use of (in connection with species here discussed) for subspecific differentiation. Distinctions based on skull characters are not to be lightly attacked, but I think in that case less importance should be attached to the ear dimension.

If we accept both *brachyotis* and *angulatus* as sub-species of *brachyotis* we have two forms of one species occupying the same localities: which is contrary to generally accepted opinion, for while nearly all zoologists recognize the inter-gradation of geographical races the great majority are not prepared to recognize overlapping or intermixture; that is to say you cannot have two sub-species of a species living side by side.

If, however, you are prepared to admit that two forms of a species do occur together there is no reason why three (or more) should not be accepted, so this alone is not good cause for not regarding *titthæcheilus* as a *brachyotis* too, though that course might certainly be less convenient.

Our suggestion was somewhat superficial, but at the moment we simply had in view the *Cynopterus* bats of the Malay Peninsula and Dr. Andersen's main dividing line of the section under discussion. To transfer *angulatus* across that line would not improve matters for then we should have two bats of the same species (*sphinx*), *titthæcheilus* and *angulatus* again living side by side. To overcome this difficulty we have three alternatives to choose from. Either *angulatus* has no real existence, the material forming it being part *sphinx* and part *brachyotis*—not very probable; or it is a very variable form of *brachyotis* of which the typical race is non-existent from Sumatra to Annam and Assam; or it is an independent species. In any case the character of the ears does not seem a very good one to rely upon for the separation of the primary forms—providing our measurements and those given for the type series are correct. C. Boden Kloss.

A NEW NAME FOR *MUS MICRODON*, KLOSS.

THIS name, applied by me to a rat from Tioman Island, South China Sea (Journal, Federated Malay States Museums, vol. 2, p 145; 1908), is preoccupied by *Mus microdon*, Peters (Reise nach Mossambique, Säugeth., p. 149; 1852) so the *surifer* race of that locality may be known as *Epinys surifer binominatus*. C. Boden Kloss.

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